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PHARMACEUTICAL JOURNAL

AND

TRANSACTIONS.

VOLUME IX.

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CONTENTS.

VOL. IX.—1850.

No. I.

Medical Reform, 1—The Proper Business of the Apothecary, 1—Quackery, 4—Liverpool Chemists' Association, 7—Pharmaceutical School Dinner, 8.

Transactions of the Pharmaceutical Society: Pharmaceutical Meeting: Purgative Properties of Oil of Anda. A. Ure, Esq., 9—Dutch Cake Litmus, Jonathan Pereira, M.D., F.R.S., 12—The Production of Plumose Alum. R. Christison, M.D., 14—Purification of Gum Arabic. M. Picciotto, 16—The Pitch Lake of Trinidad. Mr. Darling, 18—List of Members, &c. (*continued*) 20.

Original and Extracted Articles: The Electric Light. Dr. Letheby, 22—Method of Testing for Strychnia. Mr. Lewis Thompson, 24—Varieties of the Senna Plant (*with cuts*). J. B. Batka, 25—Fermented Pharmaceutical Preparations. B. Lane, M.D., 31—Glycerine, 32—The Application of Glycerine for Deafness, 32—The Preservation of Leeches. Mr. Ashby, 34—Cinnamon in Eastern Africa. Mr. W. D. Cooley, 34—Anhydrous Nitric Acid. M. Deville, 36—The Composition of Lime Water. G. C. Wittstein, 37—Chloroform in the Blood. M. Ragsky, 37—Change in Protosulphate of Iron. G. C. Wittstein, 38—Hydraulic Cement, 38—Xyloidin and Gun Cotton, 38—Letter from an Associate, 39—Meeting of Chemists at Liverpool, 40—*Notices of Books, &c.*, 46—*Correspondents*, 47.

No. II.

The Medical Bill, 49—The Progress of Pharmacy, 50—The Sewers of the Metropolis, 51—The Cholera, 53—Quackery, 55.

Transactions of the Pharmaceutical Society: Election of President and Vice-President, 56—Pharmaceutical School Dinner, 56—Transactions of the Bristol Chemists' Association: Second Annual Report, 64—Liverpool Chemists' Association, 65—Pharmaceutical Meeting, 66.

Original and Extracted Articles: Glycerine in Deafness, 68—The Electric Light. Mr. Jonathan Wilkinson, 68—Glairine. M. Bonjean, 69—Glairidine. *Ibid.*, 71—The Relations between Sugar and Tartaric Acid. M. Bouchardat, 72—The Examination of Milk. M. Poggiale, 72—The Composition of Honey. M. Soubeiran, 74—The Spheroidal State of Bodies. M. Boutigny, 75—On Animal Charcoal as an Antidote. Dr. Rand, 78—Aventurina-like Porcelain Glaze. M. Wachter, 80—Preparation of Hydrobromic and Hydriodic Acids. M. Mene, 80—The Expressed Oil of Mustard Seeds. M. St. Darby, 81—The Cost of Gun-Cotton, 84—Adulteration of Quinoidine, 84—Exhalation of Carbonic Acid. MM. Hervier and St. Lager, 84—The Weather and the Leech, W. H. Attree, Esq., 85—Family Poisoning, 86—Peat Moss and Charcoal. Mr. J. W. Rogers, 87—*Notices of Books*, 90—*Obituary:* Dr. A. T. Thomson, 90—*Correspondents*, 96.

No. III.

The Medical Bill, 97—Coffinism, 97—The Substitution of One Medicine for Another, 101—The School of Pharmacy, 104—The Liverpool Apothecaries' Company, 104—Mode of Estimating the Value of a Chemist's Business, 109—The Cholera, 111—Rottenness in the Metropolitan Commission of Sewers, 116—The British Association for the Advancement of Science, 118—The Medicine Stamp Acts, 118—The Patent Medicine Licence, 118.

Transactions of the Pharmaceutical Society: List of Members, Associates, &c., 119—Liverpool Chemists' Association: Lecture on the Starches of Commerce. Dr. Inman, 120.

Original and Extracted Articles: California in Ireland, 122—Exposition of the Products of French Industry at Paris, 127—On Plants Indigenous to the Antilles. Dr. Hamilton, 129—Test for Strychnia. Mr. Lewis Thompson, 131—Glycerine in Deafness. Mr. Yearsley, 132—The Sonometer. Mr. Wakley, 132—On the Preparation of Nitrogen. M. Corenwinder, 132—Formulæ for Sealing-Wax, 133—Warburg's Fever Tincture, 134—On Bees'-Wax, 135—On Rhine Wines, 135—Process for making Amber Varnish, 137—Polarization of Heat, 138—The Electric Light, 138—Asclepion. C. List, 139—Silvering Glass by Gun-Cotton, 140—Senna Leaves, 141—Collodium Cantharidale, 141—Ferment Oils, 142—Amidalin. M. Schulze, 142—Composition for Tinning and Zincing, 143—Deiamba, or Tobacco of Congo, 143—Unreasonableness of Science, 143—*Books Received*, 143—*Correspondents*, 144.

No. IV.

The School of Pharmacy. Seventh Session, 145—The Adulteration of Drugs, 147—Report from New York, 147—The Cholera, 150—Circular of the College of Physicians, 152—The Board of Health and the Parish Authorities, 155—The Abatement of Nuisances, 158—The Sale of Poisons, 160—The Mode of Puffing Quack Medicines, 163—A Day-Light Druggist, 166.

Transactions of the Liverpool Pharmaceutical Association: Lecture by Dr. Brett, 168—Apparatus for Distilled Water. Mr. Abraham, 170.

Original and Extracted Articles: Medicinal Wines. Dr. Lane, 171—Portable Medicines for Diarrhœa, 175—Proposed Restrictions on the Sale of Arsenic, 175—Substitution of One Medicine for Another, 176—Carbonate of Lime in Sea Water. John Davy, M.D., 178—Expansion of Alcohol and Water. Mr. Makins, 181—To Preserve Milk or Cream. Mr. Bethel, 186—Mode of Valuing a Chemist's Business. Mr. Humpage, 186—The Laboratory of Berzelius, 187—The Protein Compounds, 188—The Frequency of Inquests, 189—British Association (Birmingham), 189—Exhibition of Works of Art and Manufacture, 190—Exhibition of Drugs and Chemicals, 191—The Electric Light. Mr. Ward, 191—Pharmacy in Hungary, 192—The Apothecaries' Company and Board of Health, 194—Botanical Society, 195—*Reviews*, 196—*Correspondents*, 199.

No. V.

Secret Poisoning, 201—The Board of Health and the Churchyards, 202.

Transactions of the Pharmaceutical Society: Distribution of Prizes, 203—Questions for Examination in Materia Medica, 203—Questions for Examination in Chemistry and Pharmacy, 204—Questions for Examination in Botany, 204—The Sale of Poisons, 205—Transactions of the Liverpool Association: Hydro-Carbon or Water Gas, 210—Chlorine Fumigators, 212,

Original and Extracted Articles : Commercial Varieties of Ginger (*with cuts*). J. Pereira, M.D., F.R.S., 212—Medicinal Wines. Butler Lane, M.D., 218—Ava Root of the Sandwich Islands. W. Hamilton, M.B., 218—Recent Improvements in the Manufacture and Refining of Sugar, 220—Sievier's and Scoffern's Patents, 220—Milsen's Patent, 221—Hypotheses of the Cause of Cholera : The Ozone Hypothesis, 223—The Fungus Hypothesis, 223—Natural History of the Cinchonas. M. Weddell, 224—Cinchona Calisaya. M. Weddell, 232—Atropine and its Pharmaceutical Preparations. Drs. Bouchardat and Stuart Cooper, 232—Oil of Copaiva. C. G. Mitscherlich, 233—New Method of Analysing Metallic Salts. M. Rouchet, 233—Test of the Quality of Indigo. H. Reinsch, 234—Process for Estimating the Quality of Opium. M. A. Guilliermond, 236—Action of Light on Prussian Blue, 236—Congelation of Alcohol, 236—Preparation of Specula for Telescopes, 236—Polishing Powder for the Specula of Telescopes, 238—Death from the Fumes of Arsenic, 238—Formation of Flints in Chalk Strata, 239—Mylabris Cichorii, a Substitute for Cantharides, 239—Fumigation of Wheat with Sulphur. Mr. H. C. Andrews, 239—Adulteration of White Precipitate, 240—Table of Commercial Cinchona Barks, 240—Alleged Adulteration of Tobacco with Liquorice, 241—*Review:* Manual of Scientific Inquiry. Sir J. F. W. Herschel, Bart., 242—Medical and Œconomical Botany. J. Lindley, Ph. D., &c., 244—*Correspondents*, 247.

No. VI.

The Sale of Poisons, 249—Provincial Pharmaceutical Associations, 250—The Medicine Stamp Acts, 251.

Transactions of the Pharmaceutical Society: Meeting of the Committee on the Sale of Poisons, 253—Evening Lectures, 254—*Transactions of Provincial Associations :* Birmingham—Extract from the Annual Report, 254—Bristol : Introductory Address, 256—Liverpool : Reactions of Strontia, &c., Dr. Muspratt, 259—Carbonate of Sesquioxide of Iron. Mr. Danson, 260—Decomposition in Belladonna Juice. Mr. H. S. Evans, 260.

Original and Extracted Articles : The Commercial Varieties of Ginger. Dr. Pereira, F.R.S , 261—Hypotheses of Cholera: Ozone Hypothesis, 265—Fungus Hypothesis, 266—The Cinchona Barks. M. Weddell, 267—Two Balsam Trees from Scinde. J. E. Stocks, M.D., 270—Vanilla of Bourbon M. Bouchardat, 275—Vessels Coated with Vitrified Enamel. M. Chevallier, 277—Arsenic Employed Medicinally by the Chinese, 277—Composition of Marble, 278—Composition of Chalk, 278—Adulteration of Drugs and Chemicals: The Dilution of Ether. Mr. Pochin, 278 ; Train-Oil Capsules, 279 ; Spurious Citras Quinæ Cum Ferri. Mr. Barnes, 279 ; Adulteration of White Precipitate. Mr. Bolton, 280—Inks for Writing on Tin-Plate and Sheet Zinc, 280—Animalcules found in Water, 281—Organic Matter in Water, 281—On Patchouli. Sir W. J. Hooker, 282—Casein as an Envelope for Medicines, 282—On the Production of Manna. Mr. J. Stettner, 283—New Mode of Employing Starch to detect Iodine, 283—Colouring Matter from Orchil. Achille Chaudois, 284—Poisoning by Arsenic, 284—Poisoning by Muriatic Acid, 284—A Family nearly Poisoned by Arsenic, 285—Botanical and Pharmaceutical Desiderata, 285—The Pimlico Sewer Catastrophe, 286—National Grant for Scientific Purposes, 288—New President of the Linnæan Society, 289—Proceedings against Unqualified Practitioners, 289—The Sugar Patents, 291—The Rise and Progress of a Specific, 291—Lays of the Laboratory, 292—*Reviews :* History of the Cinchonas. M. Weddell (*with cut*), 292 ; Pharmaceutical Cabbage, 294—*Correspondents,* 295.

No. VII.

The Sale of Poisons. Progress of the Inquiry, 297—Pharmacy in Guernsey, 297—The Medicine Stamp Acts, 288—Penalties for selling Spirit of Wine. Seizure of Illicit Spirit, 300.

Transactions of the Pharmaceutical Society: Committee on the Sale of Poisons. (*First Report*), 302—Evening Lectures, 303—*Provincial Transactions:* Liverpool. Dr. Brett's Lectures on Arsenic, 304—Combination of Arsenious Acid with Albumen. Danson, 307.

Original and Extracted Articles: Turnsole. Mr. D. Hanbury, Jun., 308—The Commercial Varieties of Turmeric. Dr. Pereira, F.R.S., 309—Amomum Citratum, a New Species of Large Cardamom. Dr. Pereira, F.R.S., 313—Composition of Titanium Crystals. Professor Wöhler, 315—Notes on Heating and Ventilation. Sir S. Bentham, 315—Detection and Estimation of Cinchonine in Quinine. M. O. Henry, 320—Quinoidine and β-Quinine. I. Van Heijningen, 322—Tartarus Boraxatus. M. Wachenroder, 327—The Larger Cells in Cholera Evacuations. Rev. M. J. Berkeley, 329—Cephaelis Ipecacuanha. M. Weddell, 332—Manufacture of Varnished Leather in France, 333—Composition for Lubricating Machinery, &c., 333—Solvent for Caoutchouc, Gutta Percha, &c., 334—Acetate of Alumina for Refining Sugar, 334—Botanical and Pharmaceutical Desiderata, 334—Adulterated Muriate of Morphia. Macfarlan & Co., 337—*Ibid.* Mr. Morson, 338—Citrate of Quinine and Iron. Mr. Barber, 338—Whalebone Spatula. Mr. Tustin, 339—Adulteration of White Precipitate. Mr. H. Baly, 339—Exhibition of Works of Industry, 339—Poisoned Game, 339—*Reviews:* Manual of Botany. J. H. Balfour M.D., 339—Rudiments of Botany. A. Henfrey, F.L.S., 341—A Few Suggestions on Consumption. Dr. Robert Hall, 342—Introduction to the Pharmacopœia. S. F. Leach, 342—Literary Register and Almanack for 1850. J. W. G. Gutch, 342—*Correspondents*, 343.

No. VIII.

The Professional Character of the Pharmaceutical Chemist, 345—The Adulteration of Chemicals, 346—Prohibition of the Sale of Stills by Brokers and others, 347—The Supply of Water to the Metropolis, 347.

Transactions of the Pharmaceutical Society: The Conversazione, 349—Evening Lectures, 351—The Sale of Poisons: Supplementary Report of the Committee, 352—Statistical Returns of Suicides, &c., at the London Hospital. W. T. Fewtrell, Esq., 357—List of Members, &c., 359—*Provincial Transactions:* Bristol Pharmaceutical Association. Mr. Griffin's Lectures, 360.

Original and Extracted Articles: East Indian Senna. Dr. Royle, F.R.S., &c., 360—Adulteration of Muriate of Morphia. Mr. Morson. 361—Concentrated Tincture of Capsicum. Dr. Turnbull, 362—On the D'amba or Dakka of South Africa. Dr. Daniell, 363—Cinchona Calisaya (*with a cut*). M. H. A. Weddell, 365—Vegetable Ivory Palm (*with cuts*). Sir W. J. Hooker, F.R.S., 369—Momentary Incombustibility of Living Organic Tissues. M. Boutigny, 376—The Diffusion of Liquids. Professor Graham, F.R.S., 379—The Waters of the Metropolis, 382—The Well-Water at the Mint. Professor Brande, F.R.S., 383—Water supplied by the Hampstead Water Company, 389—Artesian Well on Islington Green, 389—Acetate of Lead in Purifying Sugar. J. G. Miranda, 190—Oxychloride of Lead for White Paint. Mr. Pattison, 390—Concentration of Sulphuric Acid. Mr. Roder, 390—Action of Nitric Acid on Iodide of Potassium. Dr. Vogel, 391—Lunar Caustic with a Metallic Nucleus, 392—Atomic Weight of Lanthanium and Didym. M. Marignac, 392—Creosote and Carbolic Acid. Dr. Von Corup-Besanez, 392—Trichromate of Potash. M. Rothe, 393—Robbery by Means of Chloroform, 393—Insanity from Chloroform, 394—Royal Institution, 395—*Correspondents*, 395.

No. IX.

The Pharmacopœia, 397—Medical Reform—Rejection of Pharmacy at Lincoln's Inn Fields, 397—The Repeal of the Window Tax, 398—The Battles of the Water Companies, 399.

Transactions of the Pharmaceutical Society: Pharmaceutical Meeting, 400—The Resin of the Norway Spruce Fir. Mr. D. Hanbury, Jun., 400—East Indian Senna. Mr. J. Bell, 401—Amalgams for Stopping Teeth. A. Rogers, Esq., 402—Spontaneous Decomposition in Gun Cotton. T. H. Tustin, Esq., 405—Spurious Tannate of Alumina, 406—*Provincial Transactions:* Liverpool Chemists' Association: Lecture on Therapeutics. Dr. Inman, 406—The Arsenic Controversy. Mr. Edwards, 407.

Original and Extracted Articles: The Nature and Effects of the Organic Matter in Drinking Water (*with cuts*), 408; Living Animals, 408; Living Plants, 410; Dead and Decomposing Organic Matter, 412—The Waters of the Metropolis, 417—The Sulphate of Copper Test for Sugar and Starch. H. Fehling, 419—Action of Sugar and Sulphuric Acid on Organic Substances. Dr. M. A. Schultze, 423—Calisaya Bark. M. H. A. Weddell, 428—Piacaba and Coquilla Nuts (*with cut*). Sir W. J. Hooker, 431—The Momentary Incombustibility of Living Organic Tissues. Professor Plucker, 433—Toxicological Properties of Sulphate of Lead, 434—Salep. Dr. Landerer, 435—Cantharidin and its Proparations. D. Oettinger, 437—The Alcohate of Nitrate of Magnesia. A. Chodnew, 439—The Temperature at which Gun Cotton Explodes, 440—The Manufactory of White Lead. Mr. J. E. D. Rogers, 440—Re-Action of Borax on Turmeric. Dr. Vogel, Jun., 441—Process for obtaining Carburetted Hydrogen. M. F. J. de Cavaillon, 441—Royal Institution, 442—The Electricity of the Atmosphere. Professor Faraday, 442—*Correspondents*, 443.

No. X.

The Removal of Nuisances, 445—Intramural Interment, 446—The Sewers of the Metropolis, 448—The Water Question, 449—The Exhibition of the Works of Industry of all Nations, 450.

Transactions of the Pharmaceutical Society: The Sale of Poisons, 451—Pharmaceutical Meeting: Analysis of an Aluminous Water. Mr. Beesley, 452—The Variable Strength of Tincture of Opium. Mr. Allchin, 454—Test for distinguishing Acetone from Pyroxilic Spirit. Mr. Scanlan, 455—Process for making Lead Plaster. Mr. Bartlett, 457—Mannite, 458—Apparatus for the Preparation of Tinctures (*with cuts*). Mr. Gale, 459—Liverpool Chemists' Association: The Specific Action of Medicines. Dr. Inman, 459—On Disinfectants. Mr. Mercer, 460—The Salts of Bismuth. Mr. Edwards, 461—Birkenhead Chemical and Philosophical Society, 462.

Original and Extracted Articles: Notice of the Copalchi Bark. James Stark, M.D., 463—The Waters of the Metropolis (*continued*), 466—Section of Strata in an Artesian Well at Islington, 468—Table of the Composition of Thames Water, 471—Tables of the Lake, Well, and River Waters, 472—The Purification of Drinking-Water, 474—Subsidation and Decantation, 474—Filtration, 475—Clarification or Fining, 477—Purification by Chemical Agents, 478—Extract from the Registrar General's Return, 481—The Preservation of Dried Plants. Mr. W. T. Coleman, 483—Adulteration of Salts of Morphia, Correspondence, 483—Trial respecting a Nuisance, 485—Explosion of Gun-Cotton, 487—Property in Quack Medicines, 487—Sale of a Business, Breach of Covenant, 488—Libel against a Homœopathic Doctor, 489—Chemical Society—Isolation of Organic Radicals, 489—*Notices of Books:* Beesley's Druggists' General Receipt Book, 491—*Correspondents*, 491.

No. XI.

The Approaching Anniversary of the Pharmaceutical Society, 493—Medical Charities, 493—The Patronage of Homœopathy, 495.

Transactions of the Pharmaceutical Society: List of Members, &c.(*continued*), 426—Liverpool Chemists' Association: Pharmaceutical Meeting, 497.

Original and Extracted Articles: The Alcohol Test of the Purity of Castor and Croton Oils. J. Pereira, M.D.. F.R.S., 499—The Adulteration of Isinglass. T. Redwood, Esq., 503—The Purification of Water (*with cuts, continued*), 507—The Preparation of Soda Water and other Ærated Waters (*with cuts*). J. Tylor and Son, 511—The Relations between the Animal and Vegetable Kingdoms. R. Warington, Esq., 521—Lead, Copper, and Silver in Sea-Water, 522—Liquor Sennæ Aromaticus, 524—The Action of Arsenious Acid on Albumen. Mr. Edwards, 524—The Combination of Arsenious Acid with Albumen. Mr. Kendall, 526—Action of Nitric Acid on Rhubarb. M. Garot, 528—Colouring Matter from Rhubarb. Mr. Cobb, 529—Oxide of Zinc as a Pigment. M. Chevalier, 530—Importation of Oxide of Zinc, Duty Free, 532—Passive and Active Oxygen, &c. Dr. A. Buchner, 532—Galvanic Cell without Zinc. &c. D. H. Reinsch, 533—New Gunpowder, 534—Alleged Employment of Chloroform by Thieves. Dr. Snow, 535—Barks of Rhamnus Frangula, &c. M. Binswanger, 537—Specification of Attwood and Renton's Patent for Starch, &c., 539—Wongshy, a New Yellow Dye. N. Stein, 541—Solubility of Iodine in Cod-Liver Oil. Fleischmann, 541—Oleum Hyoscyami Infusum. Overbech, 541—Cathartin of Ripe Blackthorn Berries. Dr. Winckler, 542—Belgian White Lead, 542—Residue of Cinchona Bark, 542—On Aristolochia Clematitis. Dr. F. L. Winckler, 543—On the Purification of Honey. A. V. Hirschberg, 543—Unguentum Potassii Iodidi. A. W. Brieger, 543—Analysis of the Seeds of the White Poppy. Sacc, 543—Iridescent Paper. A. Wagner, 544—Jute: Corchorus Capsularis. Sir W. J. Hooker, 545—Chinese Rice-Paper, 545—*Books Received*, 546—*Correspondents*, 547.

No. XII.

The Isinglass Fraud, 549—The Alleged Adulteration of Morphia, 549—The Works of Industry of all Nations, 549—The Progress of the Water Question, 550.

Transactions of the Pharmaceutical Society: The Conversazione, 551—Testimonial to Mr. Redwood, 553—Ninth Anniversary of the Pharmaceutical Society, 553—Annual Report, 555—Liverpool Chemists' Association: Lecture on Impurities and Adulterations. Dr. Brett, 562—Some Remarks on the Bootle Water. Dr. S. Muspratt, 564.

Original and Extracted Articles: The Adulteration of Isinglass, 565—Report of Messrs. Phillips and Cooper, 565—Comments on the Report, 567—Oxychloride of Calcium. Mr. Beesley, 568—The Microscopical Analysis of the Dust of Blood Rain, &c., 569—Tests of the Purity and Adulteration of the Volatile Oils, 575—Bitter Almonds, Cloves, Cinnamon, 575—Sassafras, Star Anise, 576—Common Anise, Rue, Cajeput, 577—Peppermint, Thyme, Lavender, 578—Cubebs, Bergamot, Copaiba, 579—On Oil of Peppermint. B. Sandrock, 580—The Purification and Properties of Chloroform. W. Gregory, M.D., 580—Test for Chloroform. Dr. Snow, 584—Alleged Use of Chloroform by Thieves, 585—Pharmaceutical Desiderata, 585—Cheap Printing Ink, 586—New Re-Agent for detecting Sugar in Liquids, 587—Solutio Cantharidis Etherialis, 588—Adulteration of Milk, 588—Orchil and Cudbear, 588—Chrome Ink, 588—White Enamel for cementing Earthenware, 588—Red Colour for Paper Hangings, 588—Preparation of Rosin Oil, 589—The Sale of Poisons: Proposed Enactment, 589—Poisoning by Sheep-Wash, 590—Sale of Laudanum by Chemists, 590—Alleged Breach of Contract in the Sale of a Business, 591—*Reviews, &c.*, 591—*Obituary:* Gay Lussac, 593—*Correspondents*, 594—*Index to the Volume*, 595.

THE PHARMACEUTICAL JOURNAL.

VOL. IX.—No. I.—JULY 1st, 1849.

MEDICAL REFORM.

Another month has passed, and no Medical Bill has appeared. The Diagnosis which we gave last month, afforded but little prospect of a favourable result, and we are not at all surprised to hear that Sir George Grey and the Lord Advocate have abandoned the Bill for the present. Whether it will be presented to Parliament during the present session or not, is uncertain; but it is quite certain, that if presented it will undergo another period of incubation.

After all the labour which has been bestowed, and the speculations which have been rife on the subject, it would be a disappointment to all parties to see no Bill this session. At the same time we can fully appreciate the reluctance so naturally evinced by those on whom the responsibility rests, in bringing forward a measure, with the prospect of serious opposition from several parties on opposite grounds. But viewing both sides of the question dispassionately, we cannot see any means of escape. The assistance of all parties has been obtained in the accumulation of materials as data on which to found a Bill. Public money has been expended in these proceedings. Those who undertook the task, had the experience of their predecessors before their eyes, and it is only fair to the public, that the result should be brought to light.

In one respect, the Bill stands in a favourable position. It has been so completely "burnt in effigy" before its appearance, that it would be difficult to invent any invectives which have not already been heaped upon its shadow; and if it should be found on examination to possess any merit—to be at all tolerable, its opponents will hide their diminished heads, and blush to think that they have condemned a child unborn, whose comeliness exceeds their expectation.

THE PROPER BUSINESS OF THE APOTHECARY.

Gradual innovations when confirmed by time, are shorn of their asperities, and by the force of habit the exception sometimes becomes the rule. We have, on former occasions, alluded to the transmigration of the so-called Apothecaries of this country, from the laboratory to the sick-room; which change of condition was not effected suddenly or by design, but was the gradual result of the natural tendency of the human mind to extend the field of its operations, when circumstances or the demands of the public furnish an opportunity.

But the human mind is limited in capacity, and like the body, it is not ubiquitous. Consequently, a vacuum was left in the laboratory by the emigration of the Apothecary to the bedside of the sick, and as "nature abhors a vacuum," this was filled by the Chemists, who became Apothecaries in every respect except in name. The term "Apothecary" is still associated in the public mind with the class originally so designated, while it has acquired a new meaning, being held to imply a medico-surgical instead of a pharmaceutical qualification.

If any person were asked to define an Apothecary, he would say he is a medical practitioner, who prescribes and dispenses; and if a Chemist were to assume the name of Apothecary, he would be considered an impostor, because custom concedes to him the substance, but withholds the shadow.

This inconsistency, although scarcely noticed by those who have it constantly before their eyes, strikes the impartial observer with astonishment; and the facts of the case are thus stated by Dr. Wood*, of Philadelphia, who recently visited this country, and made himself acquainted with the history and condition of our medical and pharmaceutical institutions:

"The original and proper business of the Apothecary was no doubt to prepare and vend medicines; and this it ought still to have continued to be. In the United States, he remains what he originally was; and the consequence has been, that by a concentration of time and abilities upon his own pursuit, he has elevated Pharmacy from the rank of a mere trade to the dignity of a profession, and increased in a corresponding degree his own personal respectability. It was otherwise in England. There, the Apothecary, though he continued to prepare and sell drugs, superadded the practice of the different branches of the medical profession to the pharmaceutical, which thus became secondary in his own estimation and that of the public. Without becoming a good medical practitioner, he ceased to be a good pharmaceutist, and the name of Apothecary came at length to signify a mongrel compound of doctor, man-midwife, surgeon, and drug vendor; a true jack of all trades and master of none, willing to play second part to the regular Physician, and, though used by the public, yet looked on by them with a sort of good-natured contempt."

If we may be allowed to imagine a transition stage between the chrysalis and the moth, this is the stage in which Dr. Wood has correctly described the Apothecary of this country. He is not yet emancipated from the pestle and mortar, while he is flying about the town in his brougham, or perambulating from patient to patient with his gold-headed cane.

With such an example before them, it was not at all surprising that the Chemists evinced a disposition to take a similar course.

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* Introductory Lecture to the Course of Materia Medica and Pharmacy in the University of Pennsylvania. By George B. Wood, M.D., Professor of Materia Medica and Pharmacy. Delivered October 19th, 1848. Philadelphia: T. K. and R. J. Collins, Printers.

They were not recognised as Apothecaries, they held no legal position as Chemists, they were under no jurisdiction, nor were they bound together by any tie, either social or political. As a body they had no character to lose ; as individuals, each chalked out for himself the course which suited his fancy ; and if some deviated from the path which others considered legitimate, there was no court of appeal,—there was no standard of normal pharmacy by which the proper boundary line could be defined. The only privilege they enjoyed was the exemption from interference, contained in the Apothecaries' Act of 1815 ; and this could only be made available in case of attack, by means of evidence respecting the custom prior to that date, the *onus probandi* resting on the defendant. In this imperfect state of the law, a smattering of medical knowledge, fortified with a certain amount of confidence, and stimulated by ambition, would occasionally convert a Chemist and Druggist into a medical practitioner. Some practised *ad libitum* behind the counter, others went so far as to visit patients ; and the public not being able to recognise any difference between the shop of an Apothecary and that of a Chemist, promoted this confusion by applying indiscriminately to the two classes both for medicine and advice. The Apothecaries, perceiving that the Chemists were treading on their heels, as they were themselves treading on the heels of the Physicians, took the alarm, and endeavoured by *precept* to neutralize and overcome the effect of their own *example*. With Mr. Hawes as their champion, they concocted a Bill which was intended to check the threatened encroachment. The Chemists in turn were panic-struck, tied their "bundle of sticks" together, and repelled the attack.

The fermentation which this movement occasioned, has produced an entire change in the prospects of the parties concerned. The froth and scum have been thrown off, the dregs have settled down, and only the finings are now wanting to make the resulting compound clear and palatable. The Chemists are no longer aspiring to medical honours ; the Apothecaries have discarded their old name, and assumed the more dignified title of General Practitioners. The respective functions of the two classes have been fully discussed, and are more clearly understood. The foundation of a compromise is laid, and if the superstructure should be completed, both parties will materially improve their position. However desirable it might be, it would be impossible to carry out the absolute separation of the two offices according to the strict letter of the law. The Chemist ought to understand the nature and properties of the medicines which he prepares, and it is a part of his duty to give general information on the subject when enquiries are made by his customers. The medical man cannot be prohibited from keeping in his house a few medicines for cases of emer-

gency if he think proper, and to his discretion this must be left. But it would be quite possible, and we think not very difficult, to bring about an arrangement which would be a radical cure for the jealousy now existing between the two parties. The Chemists should be recognised by law as the true Apothecaries or Pharmaceutists, and to them should be entrusted the education and examination of all persons obtaining a qualification in Pharmacy. The Apothecaries, or General Practitioners, should become what they call themselves—professional men, receiving remuneration directly for their advice, and not indirectly through the medium of the drenching system. Of late years the minds of this class of practitioners have expanded, their medical education has improved, and they aspire to a higher position than that which they have hitherto enjoyed. They repudiate the idea of an inferior grade, and claim to be placed on an equality with the Physicians. Yet they cling to APOTHECARIES' HALL—that is their *shop*.

QUACKERY.

THE ingenuity of quacks is only equalled by their impudence. Occasionally, however, this acuteness over-reaches itself, as in the instance before us. The vendor of a specific (appropriately called a "rob") has issued the following lithographic circular to the medical profession :—

"315 *a*, *Oxford Street, London*, 15*th May*, 1849.

"SIR,—I take the liberty to send you herewith a medical *brochure* by Dr. Giraudeau de St. Gervais, actual proprietor of a medicine known under the name of *Boyveau Laffecteur's Rob*.

"My purpose in sending this work is not in any way to suggest you curative means which, I feel confident, are all well known to you, but simply to attract your attention upon a remedy that has been for seventy years in continual and increasing repute and success in the cure of diseases which very likely you often meet with in your practice. A perusal of the work may eventually induce you to test the efficacy of that composition deposited in my hands.

"Should you feel inclined to prescribe the *Rob* to some of your patients, I should find it a justice to offer you a share in the sale of that valuable medicine. The price is 10*s*. a bottle, out of which 3*s*. will be allowed to any practician sending a signed prescription.

"I will be most happy to afford you any particulars you may require. The learned Doctor intends to visit this country every year for the same purpose. "I am, Sir, your most obedient servant,

"L. LAMENAUDE."

This indignity to the profession should be properly exposed and resented. It will be observed, that the practician is required to sign the prescription ordering the "rob." On this condition he is to receive 3*s*.; and we presume, in addition to the money, he may expect the honour of seeing a *verbatim* copy of his signed prescription printed with a long list of similar documents on a hand-

bill or in a pamphlet, thrust into the hands of passengers in the street, or thrown into cabs and omnibuses, like the poetical effusions of Moses. It is due, however, to the author of this proposal to observe, by way of palliation, that, being a native of France, where the laws against secret nostrums and quackery are remarkably strict, he avails himself of the laxity prevailing in this country, conceiving that the English public may be gulled to any extent by such artifices. In this notion he is not unsupported by precedent, but his error consists in the manner in which he has baited his hook for medical practitioners, who are not quite so degraded or so stupid as he appears to imagine.

Probably the adventures of M. Ledoyen in pushing his "patent fluid," escaped the observation of M. Lamenaude, otherwise he might have been tempted to apply to the Board of Health for patronage, and to the Government for a fee of £1000 for a trial of his nostrum in Canada.

While on this subject, we may notice a very respectable-looking pamphlet, entitled "HOSPITAL REPORTS AND OTHER OFFICIAL DOCUMENTS, from the German," relative to the trials of Warburgh's Fever Tincture (Tinctura Warburgi), in cases of intermittent and other fevers, instituted by order of the Austrian Government. The first page (dated from Vienna, December 18, 1848) reveals the nature of this treatise :

"The great object of my life,—that for which, as you know, I have toiled, in and out of Europe, for the last twenty years,—is now at last, to a certain extent, accomplished.

"After the severest and most extensive trials, which have been made by express order of the Government here, my Fever Tincture has been officially reported upon by the Chief Physicians of Austria, and declared to be,—as you will see by the Imperial Decree of February 10th, 1847,—the safest and most efficacious febrifuge hitherto known, bark and its preparations not excepted.

"You can easily imagine that this gratifying result has led to something more than merely giving the child a name, which is now *Tinctura Warburgi*, under which it is officially recognised, and incorporated in the civil and military Materia Medica of Austria. All Apothecaries throughout the Empire are ordered to keep a supply of my tincture in their pharmacies; the civil and military hospitals are supplied from my laboratory; and all Physicians and Surgeons holding appointments under the Government here, are, in endemic and epidemic cases, authorized to prescribe and use my medicine, *at the expense of the Government funds.*"

In addition to numerous statements and documents from different persons, medical men and others, we find an article purporting to be a *Decree of High Chancery*, stipulating as follows :

"1. Dr. Warburg shall establish in Vienna a laboratory for the purpose of preparing his medicine, where he must constantly keep a supply of the ingredients, adequate to the requirements of the whole empire.

"2. That this Tincture shall be prepared solely under his own immediate inspection and superintendence, of equal good quality to that

hitherto supplied to the public hospitals, and that he shall use no admixture of a deleterious nature.

"3. That the Tincture be put into the phials adopted by him for that purpose, well corked, and sealed with his family seal; and, to prevent adulteration, such phials shall be labelled with the peculiar stamped label registered by him.

"4. The price of two florins and thirty kreutzers c. mz.* per phial, is fixed as a general basis, and must not, therefore, be exceeded.

"5. Dr. Warburg shall establish in Vienna, or its immediate vicinity, a general depôt, the locality of which he shall communicate hereafter to the Regency; whence Physicians and Surgeons, and all persons authorized to deal in medicine, may at all times obtain a supply of the said Tincture, of genuine quality.

"6. This Tincture shall only be sold under the denomination of 'Warburg's Fever Tincture' (*Tinctura Warburgi*), public Apothecaries, those who are authorized to keep dispensaries, Physicians and Surgeons, being alone permitted, by the existing medical laws, to dispense it. Apothecaries may only dispense this Tincture in the same manner as all other remedies marked with a cross (+), in the Austrian Medical Tax Ordinance of the year 1836, under the prescription of duly qualified Physicians and Surgeons.

"7. An exception is made in favour of this Tincture, permitting it to be sold by Druggists wholesale, but only to Apothecaries and to such Physicians and Surgeons in the country districts as are authorized to keep private dispensaries. The strict observance of this regulation is confided to the supervision of the Board of Health.

"8. The prohibited direct sale to patients, or to persons not legally authorized to deal in medicine, whether on the part of the discoverer, from his depôt, or of Druggists, shall be punished according to provisions 109 and 110 of the Statute Book, vol. ii.; and the dispensation of this medicine on the part of an Apothecary, without the prescription of a duly qualified Physician, will be treated as a heavy police transgression, according to section 13 of the Medical Tax Ordinance of 1836, to which is prefixed a circular from the Regency of Lower Austria, dated February 26th, 1836.

"9. Every proved falsification of this medicine shall be punished according to the existing laws, that is, as the section 104, vol. ii., of the Statute Book prescribes, against falsification and badly-prepared medicines.

"10. All public medical officers are authorized to use this Tincture in the same manner as all other officinal preparations, in appropriate cases; and, in epidemic and endemic diseases, to prescribe the said medicine at the expense of the public funds. But in this case without the usual deduction of per centage.

"The foregoing Decree is hereby communicated to the Regency of Lower Austria."

Whether this be authentic or inventive, it is equally remarkable; since it is either a very extraordinary proceeding on the part of the Austrian Government, or an instance of unprecedented effrontery in the vendor of a quack medicine.

We subjoin another case rather nearer home, namely, a copy of a hand-bill, which, we understand, is thrust under the doors in the neighbourhood of Gateshead and Newcastle-on-Tyne.

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* Five shillings English.—Tr.

"C. D. Henderson, M.D., Member of the Royal College of Surgeons of Edinburgh and London, and late of the Royal Navy, by the request of a number of respectable families of Gateshead, has commenced his profession, and begs most respectfully to inform the ladies and gentlemen of Gateshead and its vicinity, that he has commenced the practice of medicine, surgery, and midwifery ; and from his experience in his profession and attention to business, hopes to merit a share of public favour. Dr. Henderson, while in the Royal Navy, visited North and South America, the West Indies, Coast of Africa, &c , and has ha l the honour of administering medicine in almost every climate, especially in cases of cholera.

"Mr. Bell, Chemist, Battle Bank, having informed Dr. H. of his valuable and successful discovery in the treatment of cholera, intends to adopt Mr. Bell's practice, being convinced of its superiority to any other treatment hitherto discovered. Dr. Henderson will give advice to poor families *gratis*, who cannot afford a medical attendance.

"*** Residence, No. 31, Melbourne Street, Gateshead. Observe, plate on the door. Entrance to the Surgery by the back door.

"On Mr. Henderson's absence from home, apply to Mr. Bell, Chemist, Battle Bank, Gateshead."

THE LIVERPOOL CHEMISTS' ASSOCIATION.

In another part of this number will be found a Report of a Meeting of the Pharmaceutical Chemists of Liverpool. We have the satisfaction of announcing the result of the first proceedings of the Committee appointed on that occasion. We are informed that it is determined to form an Association to be called "The Liverpool Chemists' Association." This name is adopted in preference to that of "The Liverpool Branch of the Pharmaceutical Society," in order that those who are not Members or Associates may feel no hesitation in joining. The subscription from Members and Associates will be half the amount paid by strangers, who, by thus associating, may probably be induced to join the parent Society. At all events, they will assist in promoting the objects of that institution, and will have an opportunity of becoming acquainted with its progress and advantages.

We hope to be favoured next month with an official report of the organization of the Association. In the mean time, we may give in general terms a brief outline of the proposed plan as furnished to us by the Secretary.

It is intended to hold Pharmaceutical Meetings periodically, at such intervals as may be found desirable ; and arrangements are in progress for the delivery of a few lectures on subjects connected with Pharmacy. In this latter part of the proceedings, several eminent teachers have volunteered their assistance in their respective departments, and a few lectures are in contemplation on each of the following subjects :—

Botany	Dr. Dickenson
Materia Medica	Dr. Inman
Toxicology	Dr. Brett
Organic Chemistry.....	Dr. Muspratt
Inorganic Chemistry	G. Hamilton, M.A.
Pharmacy	Dr. Waldie

Mr. Edwards has proposed to deliver three lectures *On the Imponderables.*

The propriety of forming a Library and Museum is under consideration, and arrangements have been commenced for facilitating the practical study of Botany.

Although our brethren at Liverpool were not first in the field, they appear to have entered into the spirit of the undertaking before them in a manner which affords grounds for anticipating a successful result. If by these proceedings, they can excite in the minds of the young men in that locality a desire for improvement and an interest in pharmaceutical science, they will essentially promote that kind of reform which is most desirable as a means of protecting the rights and raising the character of our body. It may not be practicable to found a School of Pharmacy on the scale of that which is in operation in London ; but this is not at all necessary. The stimulus of a few lectures will induce young men to study more diligently, and those who may look forward to joining the practical class in the Metropolitan School, will derive much benefit from this preliminary study. The occasional meetings of the Members will promote harmony, and increase the strength and influence of the parent Association in a locality which has always been distinguished for the energy and spirit with which useful undertakings are commenced and carried out.

THE PHARMACEUTICAL SCHOOL DINNER.

After the discouraging comments which we felt it to be our duty to make last month, on the apathy of some of the Associates, it is gratifying to observe that a very different spirit animates those who have experienced the benefit of the improved education which it was a leading object of the Society to introduce. As a means of promoting harmony and extending the interest in this important branch of the Institution, a Pharmaceutical School Dinner is proposed, and is announced on the cover of this number. Originating as it does among the Students themselves, the proposition has been warmly seconded by many of the Members of the Society, who are desirous of encouraging this evidence of zeal in the cause of Pharmaceutical education among the Junior Members of our body.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

WEDNESDAY, JUNE 13, 1849.

MR. JACOB BELL IN THE CHAIR.

The following papers were read:—

ON THE PURGATIVE PROPERTIES OF OIL OF ANDA.

BY ALEXANDER URE, ESQ.,
Fellow of the Royal College of Surgeons of England, and Surgeon to the Westminster General Dispensary.

I WAS requested some months back by your Professor of Pharmacy and Chemistry, Mr. Redwood, to investigate the therapeutic properties of an oil expressed from seeds imported from the Brazils, and which seeds are much used by the natives of that country as a cathartic, in doses of from one to three. The plant which yields it is the *Anda Gomesii*, so named after Gomes, who described it, although a previous description had been given by Piso. It belongs to the natural order of Euphorbiaceæ, and to that of Monæcia Monadelphia in the sexual system. In referring to the *American Cyclopedia of Practical Medicine and Surgery* (vol. i., Philadelphia, 1834) we learn that "the part used in medicine is the fruit, which is about the size of an apple, and of an ash-colour. On removing the external husk a nut is presented to view, which is about two inches in diameter. It has a hard shell, which, on being broken, exhibits two cells, each containing one seed about the size of a chestnut." * * * "By expression these seeds furnish a clear, pale, yellowish oil, which is destitute of taste and almost of smell; at common temperatures as fluid as olive oil." From experiments made in the Pennsylvania Hospital, by Dr. Norris, it appears that in doses of fifty drops it generally induced one evacuation, and in larger quantities operated copiously.

The oil employed by me, kindly supplied by Mr. Ince, of the house of Godfrey and Cooke, had a specific gravity of .927, and corresponded in sensible properties to the above description. I found, however, a smaller dose suffice to produce a purgative effect than that stated on the authority of Dr. Norris. I believe, indeed, that many purgative remedies in small doses increase the peristaltic motion, and thus ensure evacuation, which in larger doses would occasion only colic pains and costiveness. This fact

is based on the physiological principle, that slight stimulants are more efficient than those of a violent character in awakening sympathetic action.

I now adduce short abstracts of some cases in which this oil was tried:—

D. H., aged twenty years, came under my care for scrofulous disease of the hand. Had been troubled with constipation of the bowels since infancy; having an alvine discharge, upon an average, once in three days; the evacuations being hard and scybalous. He was directed to take, upon the 11th of October, 1848, twenty drops of the oil of Anda every morning on a lump of sugar. On the 18th he informed me that the first dose operated freely as an aperient, the second dose on the following day, and the third dose also, but seemed to occasion some nausea. This man was of a marked scrofulous habit, and most probably owed the nausea to some coincident irritability of stomach.

A. H., aged nineteen years, of spare make and sedentary habits, was admitted under me on the 27th of November, 1848, for an eruption on the skin. She complained of headache, uneasiness of the chest; her bowels were so constipated as to be partially unloaded but once in three days; her tongue was white, and she felt feverish. She was ordered saline effervescent draughts and twenty drops of oil of Anda every morning on a piece of sugar. On the 11th of December it was reported that each dose operated thrice. She recovered, and by taking ten drops for a few successive mornings, succeeded in getting her bowels to act once daily.

R. J., aged thirty years, a powerful muscular man, came under my care on the 24th of January, 1849, for an affection of the urethra. His bowels were habitually costive while resident in London. He was directed to take, in the first instance, compound powder of jalap; but this failing to operate, the oil of Anda was administered instead. After swallowing for three consecutive nights thirty drops as a dose, he obtained a daily evacuation, and needed no further assistance in the way of purgatives.

L. C., aged forty-six years, a female of spare habit of body, subject to piles and to habitual constipation, so that she had rarely a motion within every four days, and while in that condition suffered from severe pain darting from the hip down the leg, procured relief by taking ten drops of the oil at bed-time.

A. M., aged twenty-nine years, admitted under my care for mammary abscess. Her bowels were always confined, so that she seldom had any passage except at an interval of eight days. Had taken full doses of castor-oil alternated with compound rhubarb pill, and also a combination of Epsom salts and cream of tartar, without any result. On the 12th of February, 1849, twenty drops of the oil of Anda were prescribed to be taken every night. On

the 14th it is reported, that "the doses taken on the 12th and 13th operated seven or eight times each day, without griping, and she felt, generally, better since. The bowels of an infant she was suckling were likewise freely moved, and the stools were green." She was then directed to take fifteen drops, which served to ensure adequate alvine discharge.

It may be observed, that the average dose of oil of Anda administered was twenty drops, and to secure its entrance into the stomach it was swallowed on sugar. It offered nothing unpleasant to the taste, produced none of that heat in the throat which croton-oil creates, seldom occasioned nausea or griping; it rarely operated within a period of two hours, although in one or two instances I have known it act within half-an-hour after its ingestion.

Towards the maintenance of health it may be laid down as an essential condition, that the *effete* remains of food, and of the spent tissues and secretions present in the alimentary canal, should be evacuated at periodical intervals. Human fæces, of which these may be said to form the aggregate, exhibit all the signs of putrefying matter; they have a putrid smell, and animalcules of the *infusoria* class are developed in them. Hence it may be readily supposed that if the fæcal excrementitious matter, averaging five ounces daily, be allowed to accumulate and remain for an undue length of time in the body, it must become a source of noisomeness and disease. It is, indeed, well known that some persons who have passed several days without being thus relieved, exhale a stercoraceous odour. One of the worst forms of putrid fever I ever witnessed, and which eventually proved fatal, distinctly emanated from this cause. Every body is familiar with the nuisance created by cesspools when vent is not given to their fetid contents; and does it not seem strange that individuals of moderate intelligence should, from want of a little attention, actually carry for days within them a nucleus of pollution, a cesspool in miniature? It is to inhabitants of populous towns, who lead a sedentary life and are much confined within doors, that the above remarks especially apply; and without more than strenuously urging here the paramount importance of air, exercise, and diet in obviating costiveness, I have briefly directed the notice of the Society to a medicinal agent not heretofore employed in this country, and which may be found serviceable in promoting the above purpose.

ON THE COLOURING MATTERS OF DUTCH OR CAKE LITMUS.

BY JONATHAN PEREIRA, M.D., F.R.S.

The object of the present notice is to draw attention to the colouring matters employed by the Dutch to colour *cake litmus;* which, as is well known, is wholly imported from Holland.

The essential colouring matter of this pigment is obtained from lichens. In England two dyes or pigments only, both of a purple colour, are procured from these plants: they are *orchil* and *cudbear;* the former a liquid or pulp, the latter a powder. The substances which are essential to their production are certain lichens, water, ammonia, and oxygen (of the air). By the united agency of the three latter substances on certain colorific principles contained in the lichens, one or more coloured products are obtained, which, through probably not identical, pass under the general name of *orceine*.

In order to obtain the well-known blue colour which is essential to the production of cake litmus, it is necessary to use, in addition to the ingredients above mentioned, a fixed alkali, namely. either potash or soda. Without this the product wou'd be purple, in other words it would be orchil or cudbear. The Dutch manufacturers use, I suspect, potash; for if a cake of litmus be ignited in the outer cone of the flame of a candle, the flame acquires a whitish violet tint, indicative of the presence of this alkali. This suspicion is confirmed by the statement of Ferber,* who saw litmus in process of manufacture at Amsterdam, and who tells us that besides the lichen, there were employed urine, lime-water, slacked lime, and potashes. The urine was used to yield, by decomposition, carbonate of ammonia; and the lime of course rendered caustic both the carbonate of ammonia and the carbonate of potash, and probably was otherwise useful in the process.

In order to give body to the blue colouring matter thus produced, and which I shall provisionally call *lichen-blue*, the Dutch employ some one or more earthy substances, to enable them to form the litmus into cakes. Ferber does not appear to have been aware of this; for he says that when the lichen has been sufficiently macerated, and the blue colour developed, the mixture is ground in a mill, which, he adds, he was not allowed to inspect. I presume that the Dutch manufacturer used something, in this part of the process, which he was anxious to keep secret.

The presence of the mineral or earthy constituent of litmus is readily shown by exposing some cakes of litmus, in a platinum or

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* *Neue Beytrage zur Mineralgeschicte verschiedener Länder*, Bd. i. S. 378. Mietau, 1778.

glass capsule, to the heat of a spirit lamp. The colouring matter is volatilized and destroyed, leaving the fixed constituents, presenting the volume and shape of the original cakes. Into the composition of the ashes of litmus it is not the object of this paper to enter.

In order to give these cakes a strong blue colour, the Dutch manufacturer introduces into the paste another blue colouring matter, namely *indigo*. Hitherto no one has alluded to the presence of indigo in cake litmus; yet the facts I am about to lay before the Society leave no doubt, in my mind, of its existence in all the specimens of Dutch litmus which I have hitherto examined. Ferber, of course, makes no mention of it; and I have no doubt that one reason why he was not permitted to inspect the mill was, that he might not discover the fact of the introduction, not merely of the earthy matter to give body to the cake, but also of indigo to give colour.

The existence of indigo in cake litmus is proved by the following facts:—

1st. The *colour* of the cakes is indigo-blue.

2ndly. Their *odour* when fresh is essentially that of indigo. There is also a slight violet smell, which is developed by the lichens when undergoing fermentation, and which has led some writers into the error of supposing that Florentine orris is used in the manufacture of litmus.

3rdly. If the cakes be rubbed with the nail they assume the well-known coppery lustre which characterizes indigo; but which of course is much less intense in the litmus cake than in a mass of pure indigo.

4thly. If the cakes be heated by a spirit lamp, in a platinum capsule or watch glass, a vapour is evolved, which is known to be that of indigo by the following characters:—

a. Its peculiar and very characteristic odour.

β. Its reddish-violet colour.

γ. Its condensation in the form of beautiful coppery-purple crystals, which, when rubbed with oil of vitriol, form the blue liquid known as *sulphate of indigo*, and which is decolorized by hypochlorite of lime. The crystals, when examined by the microscope, present, when viewed as opaque objects, a beautiful coppery brilliancy; and when viewed as transparent objects, by transmitted light: some of them are of a deep blue colour.

5thly. Litmus cakes, when deprived of their lichen-blue by digestion in distilled water or spirit, still retain a blue colour, showing that they contain a blue colouring matter insoluble both in water and spirit.

If these facts are considered sufficient to establish the existence of indigo in litmus cakes, it follows that the analyses of litmus

hitherto published cannot be relied on, and in fact are of little value, since none of them make any mention of indigo as a constituent of litmus.

My examination of litmus cakes leads me to infer that they consist essentially of five parts:

1. *Lichen-blue.*
2. *Indigo-blue.*
3. Organic remains (portions of the lichenous tissues).
4. An ammoniacal salt, separable from the cakes, by sublimation, in the form of carbonate of ammonia.
5. Mineral or earthy matter (chalk, &c.)

The lichen-blue is the peculiar colouring matter which renders litmus valuable as a test. It is soluble in water and in spirit, is reddened by acids, but does not become green by the addition of alkalies.

ON THE PRODUCTION OF PLUMOSE ALUM, AT THE HURLET MINE, NEAR PAISLEY.

BY ROBERT CHRISTISON, M.D., F.R.S.E.

HAVING had an opportunity not long ago of visiting the celebrated Alum Works and Mine, at Hurlet, near Paisley, I was fortunate enough to obtain a series of interesting specimens, illustrating the progressive spontaneous change of alum-slate into crystalline plumose alum. As so perfect a series is very seldom to be met with—indeed, almost by no one without a visit to the mine, I have thought that the Pharmaceutical Society may wish to possess a set, which I therefore send for their Museum.

No. 1. Two specimens of alum-slate in the fresh unaltered condition. This slate constitutes the roof of an abandoned coal-mine, or *coal-waste*, of vast extent. It consists essentially of alumina, silica, bisulphuret of iron, and bituminous matter. The bisulphuret of iron in every stratum of this mine is remarkable for the facility with which it undergoes oxidation under exposure to the air. That property is exemplified by specimens 6 and 7.—No. 7 is a specimen of pyrites, which is undergoing conversion into sulphate of protoxide of iron, being already covered on the surface, which was fresh in November last, with crystals of that salt. So great indeed is its tendency to oxidate, that, after it has formed a sufficient efflorescence of salt, it will be necessary to exclude it carefully from a free supply of air, otherwise in the course of time it will crumble to pieces, and all pass into the state of sulphate. It is worthy of notice that there seems no tendency to pass into the state of sulphate of the sesquioxide, or to form subsalts of that oxide.—No. 6 consists of a few fragments of native

copperas or sulphate of iron, the result of this process of oxygenation.

The bisulphuret of iron in the alum-slate possesses the same property. In the course of its oxygenation, one of its equivalents of sulphur, in passing to the state of sulphuric acid, combines with alumina ; and the sulphate of alumina and sulphate of iron protoxide uniting together form, with a large quantity of combined water, the beautiful white silky crystals of plumose alum, which are seen at successive stages of development in the specimens 2, 3, and 4, and carefully detached in the pure state in the specimen 5.

The process of oxygenation is singularly favoured in the alum mine of Hurlet by a rare concurrence of circumstances. The alum-slate constitutes the roof of the coal waste ; so that when a thin layer scales off and falls to the ground, it has time to split up and become porous, and consequently open to the entrance of air, before another layer falls over it. Then the roof of the mine is very dry, and the floor well drained, so that the plumose alum is not carried away as it forms, but remains to assist in splitting up the slate. Farther, the mine is always at a temperature of 60° to 63°, and its air damp. And, lastly, an unusual number of old pits have been left open, so as to secure a thorough supply of fresh air. This is an important condition ; for it appears by calculation that about 600 times as much atmospheric air as is contained in the coal-waste is required to oxygenate the whole 20-inch bed of alum-slate. Nevertheless, the process of conversion into plumose alum is a slow one, so that in five years the specimen No. 4 consists of about equal weights of plumose alum and unaltered slate. I say unaltered, because I have found it to contain alumina, silica, and bituminous matter in abundance, and exactly the same proportion of bisulphuret of iron as the fresh alum-slate from the roof at the same part of the mine.

In some parts of the mine the plumose alum lies in such quantity on the floor that the feet sink through it ; and when the mine was first taken on lease by the late Mr. Charles Macintosh, the decomposed slate in some places filled up the entire five feet space between the roof and floor.

For about twenty-five years after Mr. Macintosh commenced his operations in 1799, alum was made from the decomposed slate by a very simple process, which I have not seen noticed in any account of the alum works at Hurlet, or anywhere else. The lixiviated slate yielded a solution of the two sulphates, from which sulphate of iron was first crystallised for sale ; and the concentrated mother liquor was then used for making alum by adding to it a salt of potash.

But the increasing demand for alum, and the rapid reduction of

the plumose alum in the mine, eventually rendered it necessary to have recourse to the process of calcination, which had been followed for two or three centuries at other works ; and since then oxygenation of the slate is accomplished partly by spontaneous efflorescence for two years, and partly by subsequent calcination, according to the method described in the recent English edition of Knapp's *Chemistry*, as followed at Campsie Alum Works, which belong to the same manufacturers as those of Hurlet.

In describing my specimens I have been insensibly led into more details than I had contemplated, but possibly they may interest the Society in connexion with the specimens.

Edinburgh, April 16th, 1849.

Mr. SCANLAN observed, that he had had some experience in the manufacture of alum at Whitby, in Yorkshire, and it was there found that the alum slate did not undergo oxidation until it had been calcined. In this respect, therefore, it differed from the slate found at the Hurlet mine. He believed also that the Hurlet slate was more productive than that at Whitby. At the latter place, only one ton of alum was produced from sixty tons of the slate.

ON THE PURIFICATION OF GUM ARABIC.

BY H. PICCIOTTO, ESQ.

IT is known that gum Arabic, of whatever quality, or from whatever country imported, contains, besides the pure mucilaginous substance called by some Chemists "Arabine," and which in all the different varieties is essentially the same—also more or less of all the following impurities, *viz.*, ligneous and other insoluble fibre, sand and other earthy substances and colouring matter: moreover some varieties of gum Arabic contain also a portion of that species called "Bassorine," which is insoluble in cold or hot water. These impurities necessarily interfere more or less with the good results expected in the various uses of gum Arabic, and the dark coloured sorts are totally unfit for many uses. The object of the invention to be noticed in this paper is to separate all those extraneous matters from the gum, and by thus decolorizing and purifying it, render it finer, more useful, and better available for both pharmaceutical and manufacturing purposes. This object is effected by the following process, which, after a long series of experiments and researches, conducted during the period of four years, I have found to be the best on all accounts.

Having prepared a strong and purified solution of sulphurous acid gas, I introduce into it some gum, in the proportion of one of the latter to about six or eight of the former; the mixture is kept protected from the contact of the air, and when the gum is dissolved, it is found that all or most of the colouring matter has

combined with the acid, and the other impurities have precipitated. Heat is now applied to the vessel, and the warm liquid is run off into a large receiver containing a quantity of carbonate of baryta in excess. Immediately a combination takes place, forming a perfectly insoluble sulphite of baryta, to which the colouring matter remains united, carbonic acid gas is evolved, and the liquid remains nearly colourless. Then it is filtered through some very close filters, such as would not allow the passage of any particle of solid matter, and thereby a pure, limpid, and tasteless solution of gum is obtained. Sometimes the whole of the colouring matter has not been removed, and a repetition of the process is necessary to obtain a perfect whiteness. The purified filtered solution is then concentrated by evaporation at a moderate temperature, and reduced to any required degree of density, or to complete dryness. I have constantly found that none of the physical and chemical properties of the gum thus operated upon are in any way affected.

There is also another method of separating the acid from the gum in solution, equally effective, but a small portion of colouring matter remains in the gum; it is by boiling the mixture in vacuum at a temperature under 120° Fahr. The gas which is volatilized may be absorbed by charcoal placed in the receiver, or may be conducted through a pump into another receiver containing water. The solution of gum, when the process is finished, remains free from acid, if during the whole operation it has been well protected from contact with the atmospheric air.

The process described may be varied in its details, but the principles remain essentially the same; and the gum obtained, after filtration, is not found to contain the slightest particle of any of the ingredients used, and is undoubtedly *purer* and *whiter* than the finest sample of the picked white Turkey gum.

Now, I may be allowed to add a few remarks, considering the matter in a commercial point of view. At present the white gum Arabic is a scanty product of nature: we are dependent for its supply upon the one country (*viz.* Egypt), which alone produces the article; frequently French or Austrian merchants established at Alexandria make a monopoly of it, and whatever portion is imported into this country must pass through their hands. Hence its price is high, and its uses are rather restricted. Were the supply more abundant, and the cost price somewhat more moderate, the consumption would increase enormously, for there are several trades in which white gum Arabic would be used very largely, and with great advantage to the articles produced, instead in various substitutes now in use, all of which are wanting either in the brilliancy of the gum, or in some other of its useful properties. Of this I have the direct testimony of manufacturers, especially in

the silk trade. The employment of the purified gum will assuredly improve the products of several British manufactures of considerable importance. In other respects also the general introduction of this article will be beneficial to English commerce. It will render us independent of the monopoly carried on by foreign merchants in Egypt; and it will give an increased value and importance to the produce of British possessions and Colonies, such as East India, Australia, Cape of Good Hope, &c., by rendering the sorts of gum Arabic imported from those countries available for purposes to which they could never hitherto be applied.

London, June 18*th*, 1849.

AN ACCOUNT OF THE PITCH LAKE OF TRINIDAD.

BY MR. DARLING.

The Pitch Lake at Point de Brea, Trinidad, is a mass of bitumen, called a "lake" from its resemblance to a sheet of water, of which it forcibly reminds you, although, from the blackness of its surface, it has a very sombre appearance. It is about two miles in circumference, and lies in a direct line about half a mile from the sea, and at an elevation of 138 feet above low-water mark; it is approached by a road formed chiefly of pitch, which for the greater part is very wavy and uneven; its length is about three-quarters of a mile. On the lake there are several small patches of vegetation, having much the appearance of islands; they seem to have been formed by the collection of a small portion of vegetable mould, to which some seeds have been conveyed, and it has at last increased till sufficient to afford support to several well-grown trees, of which many of the clumps can boast.

About half the lake is skirted by "high woods," as the original growth is called; the remainder is bounded by "brush," or a lower description of wood, which is a second growth, and a tall reed, called the "wild cane," or "white roseau," which at this time of the year (October) is very pretty from being surmounted by its "arrow" or flower, which resembles a feather at the top of a slender rod of fifteen or twenty feet high. Amongst the wood and brush grow some very beautiful palm trees, of which the most remarkable is called the "pitch lake palm," from its being almost confined to this part of the island; but I believe the correct name is the "morichè," or "tallipot palm." The stately palmise and the graceful palmetto, as well as the locorite palms, also abound.

The surface of the lake is closely intersected by v shaped cracks or fissures, formed by the waves of pitch not meeting for some distance below the level of the surface: some of these are five or six feet deep in the centre; they vary from three to fifteen feet in width, and in some places form themselves into little ponds, and

are always full of water. It is singular that the water in these gullies is at all times perfectly fresh and sweet, and of good quality, and that they are constantly quite full, even in the dry season, when there may not have been a shower for two months. This is probably to be accounted for by the heat of the sun acting on the surface of the pitch, and closing it to the edge of the water as the quantity of the latter lessens. In the water is a good deal of moss, and small fish are to be found in all the pools.

The depth of this body of bitumen has never been ascertained, but I am inclined to think that it is considerable, as in all the neighbourhood of Labrea it constitutes the lowest stratum, and in some places forms a bank in the sea at the depth of a fathom and more, although the land in the vicinity does not indicate the presence of bitumen..

On the surface of the lake are several craters or sources from which the pitch exudes very sluggishly. Some of these are very trifling indeed, not throwing out a stream (the motion of which is hardly perceptible) of more than three inches in diameter, and some much less; but about the centre of the lake the principal crater is generally to be found, for it changes its place. The flow from it is considerable, though like the others very slow; for about ten feet around it, the pitch has something the appearance of boiling lead, and is so soft that it cannot be walked upon: this softness seems to prevail to a great depth, as the longest rod we could procure was easily pushed to its full length into it. This crater is not much elevated. In this or a similar one, an ox belonging to one of the neighbouring estates was caught by attempting to cross it; he gradually sank, and at length disappeared, in spite of all the attempts which were made to extricate him.

This soft semi-fluid state is that in which the bitumen is found when it is called *petroleum;* being at first nearly liquid, but it acquires solidity by exposure to the air, and the evaporation of the naphtha, and it then takes the name of *asphaltum.* Its colour is black, with a shade of brown; it varies in hardness according to the length of time it has been exposed; is generally found slightly impregnated with earth; and it contains in some instances pieces of wood in different states of carbonization. Its analysis by Dr. Gould of this island, gave

Oil of tar	34 parts
Charcoal	35 "
Hydrogen, Gas, and Oxide of iron	31 "
	100

It is very heavy, and has lately been made use of for fuel for steam engines, the boiling of sugar, distilling, &c., with tolerable success; and as it differs little from Newcastle coal, except in

wanting twenty-eight per cent. of charcoal, it is not unlikely that by the addition of some wood, it may be found sufficiently good to supersede the use of coal in this island.

The *petroleum* is found in small springs in various parts of the island; it is also found in combination with sand or stone, and in this state forms the asphaltic rock. About twenty parts of this bitumen combined with eighty parts of pulverized stone, formed into a mass by heat sufficient to expel the naphtha, is the asphaltic cement at present so much spoken of. Lime and sand also serve to harden it.

Two bituminous substances, besides those already described, are found in the neighbourhood of La Brea: one is like a very pure specimen of asphaltum, but comes very near what mineralogists describe as jet. It is found in rather kidney-shaped masses; breaks easily with a very bright surface, like sealing-wax; is solid, very black, and when heated will take an impression like sealing-wax; it is lighter than the pitch of the lake. The other is bituminous wood, which in its shape resembles the branches of trees a little flattened: it is of a dark brown colour, shows the grain of the wood, and burns with a bituminous smell, and by the application of heat emits gas.

LIST OF MEMBERS, ASSOCIATES AND APPRENTICES (*continued*).

Elected in May and June.

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Calne.	Marrison, George O. R., High Street
Dartford . . .	Furmston, Samuel C., High Street
Deptford . . .	Atkins, John, High Street
Dover	*Burgess, William H., 32, Biggin Street
Edinburgh . . .	Ainslie, William
Hampton	Rhodes, Frank
Harrow	Bowen, Henry F.
Leatherhead . .	Hill, Thomas, High Street
Liverpool . . .	Thompson, John, Stanhope Street
London	*Bilton, George, Blackwall
	*Bourdas, Isaiah, 21, Upper Eccleston Place
	Jones, Henry S., Brompton
Lynn	Quincey, James C., High Street
Maidstone . . .	Cave, Thomas, High Street
Manchester . .	Jackson, Robert, 19, Princess's Street
Norwich	Lay, William R., 72, London Street
	Oxley, Frederick, 4, London Street

Nottingham . .	Fletcher, Cornelius
St. Andrew's . .	Smith, William, Fife
Stokesley . . .	Calvert, Robert, Market Place
Tunbridge Wells.	Miller, John, Mount Ephraim

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Day, Charles William Henry	London
Manning, Richard James	Cowes
Sessions, Joseph James	Cirencester
Trask, Thomas	Croydon

MINOR EXAMINATIONS.

Remington, Alfred	London
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REGISTERED APPRENTICES.

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Baker, William	Mr. Baker . . .	Chelmsford
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Bramwell, Edward . . .	Mr. Bramwell . .	Liverpool
Brown, Allan M. L. . .	Mr. Gwatkin . . .	Brighton
Butler, John S. . . .	Mr. Langford . .	Frome
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Crumpsty, George . .	Mr. Warburton .	Bolton
Daniel, Frederick . . .	Mr. Pattinson . .	Carlisle
Gage, George	Mr. Phillips . . .	Luton
Harper, Edward . . .	Mr. Lynch . . .	Manchester
Hood, William	Mr. Mackay . . .	Edinburgh
Jeffery, Robert M. . . .	Mr. Jeffery . . .	Devonport
Lawrence, Henry . . .	Mr. Clarke . . .	Richmond
Manning, Thomas D. . .	Mr. Groves . . .	Blandford
Ough, William . . .	Mr. Jeffery . . .	Devonport
Palk, William	Mr. Palk	Southampton
Rees, Daniel	Mr. Brend . . .	Swansea
Smith, Robert C. . . .	Mr. Williams . .	Manchester
Smith, William C. . . .	Mr. Corbyn . . .	Beccles
Swift, John	Mr. Judson . . .	Ripon
Taylor, Adam C. . . .	Mr. Woodroffe . .	Stamford
Tibbs, Frederick . . .	Mr. Gordelier . .	Sittingbourne
Wallis, William . . .	Mr. Williams . .	Nottingham

EXPERIMENTS RECENTLY MADE AT DEVONPORT FOR THE PURPOSE OF TESTING THE ILLUMINATING POWER OF THE ELECTRIC LIGHT.

COMMUNICATED BY DR. LETHEBY,
Lecturer on Chemistry at the London Hospital.

I HAVE no doubt that many of the readers of the *Pharmaceutical Journal*, who have become interested in the lectures lately published by Professor Redwood on the production, management, and capabilities of the electric light, may feel a pleasure in being further informed on the above subject. I have, therefore, hastily thrown together a few facts which have just been communicated to me by my friend Mr. Hearder, of Plymouth, who, has in conjunction with several scientific gentlemen, chiefly officers of the Royal Engineers, has recently made some very satisfactory experiments on the intensity of the galvanic light, and he has found that its brilliancy is much greater than is generally supposed.

The light was exhibited from the summit of the Devonport column, a position which enabled the operator to throw the luminous beams over the towns of Plymouth, Devonport, and Stonehouse, and so away to more remote localities. At a distance of about three miles from the column, the light, not having any reflector to concentrate it, appeared like a bright blue star; but when its rays were focussed by means of a twenty-one-inch parabolic mirror, kindly lent to Mr. Hearder by the Trinity Board, it threw out a blaze of surpassing brilliancy; for at Trematon Castle, which is situated at a distance of 18,266 feet NN.W. from the column, the light shone with such intensity that the spectators were enabled to see the time by the seconds-hand of a small watch, and they were also able to read ordinary writing. The ivy-leaves on the castle-tower and keep were plainly visible to them at a distance of ninety feet, and persons who were more than half-a-mile behind the keep could readily distinguish the gravel walks which surround it. "And," says Mr. Tucker, who was appointed to be present at Trematon in order to report on the appearance of the light, "we were all very much pleased by the striking effect produced by your turning the reflector upwards towards the clouds, which we clearly saw; the light then having the appearance of the tail of a huge comet, the reflector being the nucleus. I think I may state that the breadth of the intensity of the light was at least three-quarters of a mile." Such were the appearances and effects of the light at a distance of three miles from it.

After the battery had been in action about an hour, Mr. Hearder turned the mirror so as to throw the light in an opposite direction, namely, towards Bovisand, where other scientific friends were waiting to test its power. Now Bovisand is situated at a distance of 16,470 feet from the column ; and Mr. Walker, who was there to report results, states that the light was very intense, and that the shadows of his friends were projected on the yellow door of a boat-house, with surprising distinctness ; in fact its effects were pronounced to be equal to those of the full moon when on the meridian during a calm clear night. A candle, six to the pound, projected a similar and equal shadow at a distance of thirty feet ; that is to say, the shadow projected by the electric light at a distance of 16,470 feet, was equal to that cast by the candle at a distance of thirty feet : consequently their relative illuminating powers are as 301,401 to 1. According to this experiment, therefore, the light is much more brilliant than it is commonly supposed to be, for Mr. Grove has calculated that its intensity is only equal to 1444 candles instead of 301,401.

Mr. Hearder has further informed me, that the battery which he used was a Maynooth, composed of eighty cells of four square inches' surface, arranged in two series of forty each, so that he worked with a surface quantity of eight square inches, and an intensity of forty elements. The battery was charged with a saturated solution of sal-ammoniac in the zinc cells, and the usual mixture of sulphuric and nitric acids in the iron ones.

The charcoal points or cylinders were composed of finely powdered hard coke, from which the iron had been removed by means of a magnet. They were prepared by mixing the powder with a little coal tar, then ramming it hard into an iron tube, in which it was afterwards baked at a white heat for one hour.

With these arrangements, Mr. Hearder says that he can easily keep up a constant light for upwards of an hour : and I have no doubt that the brilliancy, steadiness, and duration of the light, may be still further increased by soaking the charcoal cylinders in saturated saline solutions ; for in the course of some experiments which I have recently made with a Grove's battery of only twenty cells, I have found that the intensity of the light is doubled by steeping the coke in a strong solution of common salt, whereby I have been enabled to obtain a longer and steadier, as well as a brighter arc. It is possible also to get coloured lights by soaking the coke in solutions of copper, strontian, potash, &c.

I may in conclusion remark, that Mr. Hearder has made use of various kinds of charcoal in the manufacture of his cylinders, but not with the same final success ; for those which were made of box-wood charcoal became unmanageably hot, soon after the generation of the light, while those which were fabricated of lamp

black burnt away a great deal too fast, and cylinders composed of animal charcoal evolved the disagreeable fumes of phosphoric acid, &c. He concludes, therefore, that the hard coke from gas retorts is, after it is deprived of the greater portion of its iron, best suited for the fabrication of the charcoal points.

METHOD OF DETECTING THE PRESENCE OF STRYCHNIA.

BY MR. LEWIS THOMPSON.

As the following means of detecting the presence of strychnia may occasionally be found useful in medico-legal investigations, its publication can scarcely fail to interest some of your readers. Having placed a drop of strong sulphuric acid on a piece of glass, add to it a small quantity of the suspected substance, and stir the whole together, so as to favour solution; then sprinkle over the mixture a little powdered bichromate of potash, and gently move a glass rod through the fluid. If strychnia be present, a violet colour of considerable beauty will be almost immediately produced, which, after a few minutes, will fade into a reddish-yellow, but may be renewed by the addition of more bichromate so long as any strychnia remains undestroyed in the mixture. In this way $\frac{1}{1000}$th of a grain of that alkaloid may be made to yield a very decisive indication. The points to be noticed are, that sulphuric acid alone produces no apparent effect, and that the action begins at once around each particle of the bichromate, so that if the glass be held in a vertical position, streams of a violet-coloured fluid may be seen to flow from each particle; and if, at this time, the whole be slowly stirred, the entire bulk of the fluid will speedily assume the same characteristic tint.

In conjunction with my friend Mr. Morson, of Southampton Row, I have thus examined the following alkaloids: Morphia, brucia, aconita, atropia, codia, narcotine, picrotoxia, cinchonia, quina, solania, veratria, and phloridzia, but without noticing anything at all calculated to throw a doubt upon the value of the indication thus obtained, as a means of demonstrating the presence of strychnia. In these experiments the usual sources of error were sought to be avoided by the employment of pure materials—the alkaloids having been manufactured with great care. Compounds containing nitric or muriatic acid are, for obvious reasons, unfit for such investigations—the pure alkaloids and their sulphates being alone unobjectionable.

Byker Bar, Newcastle-on-Tyne, June 18th, 1849.

ON THE PLANTS FROM WHICH SENNA-LEAVES ARE OBTAINED.

BY J. B. BATKA.

As I intend to notice only the officinal sorts of senna-leaves, as being by their medicinal qualities best known and distinguished, I may be permitted to make a separate genus of *Senna*. The fact that none of the officinal sorts actually possess the glands mentioned by Forskäl and De Candolle, and that the genus *Senna* is distinguished from the other species referred by De Candolle to *Cassia* by the peculiar form of the *fruits* (folliculi), their *dissepimenta* and *seeds* will justify this proceeding.

Although senna is one of the best known and most frequently employed medicines, botanists have not yet succeeded in making out the confused synonyms of the genus; and I myself should not have been able to have done so but for the abolition of the monopoly which the government of Egypt held for so many years. This has given me the opportunity of becoming separately acquainted with the different species and their fruits, of which formerly Alexandrian senna was made up at Boulac, near Cairo. For several years past the various sorts of senna-leaves with their follicles have been obtained unmixed directly from the places where they grew. Formerly the follicles were in part picked out and sold separately under the name of *Folliculi Sennæ;* and as it was not known to which leaves these isolated follicles belonged, no judgment could be formed of those which were found in Alexandrian senna. The following senna-leaves are imported by us from the East:—

1. From Alexandria, under the name of *Apalto Senna*, the mixture consisting of three different species of senna and of the *Cynanchum Argel*, discovered by Nectoux and Delile.
2. From Mecca, by way of Alexandria, the well-known narrow-leaved *Senna*.
3. From Syria, by way of Aleppo, the obovate leaves.
4. From Tripoli, the mixture of two species, first discovered by Nees and myself.
5. From the East Indies, the narrow-leaved wild-growing Mecca Senna, and the Tinevelly Senna grown from seeds.

The description of Alexandrian senna is found in every class-book. But as it contains the three principal species of all officinal senna-leaves, it is important that I should give their botanical analysis and their special diagnosis; and also examine the prevailing opinions respecting them.

Having, during my long residence in Trieste, bestowed great attention upon this subject, and afterwards received the communications of my lamented friend Sieber, and seen with great interest the beautiful specimens of Ehrenberg, in Berlin, where I was assisted by the advice of my friend Hayne, and having lastly examined in Paris Delile's plant in company with Delile himself, I felt the importance of also inspecting Forskäl's plants in Copenhagen. My late friend Professor Schumacher, who resided there, had for some time been engaged with the examination of the same subject, and we examined together the specimens from Forskäl's own hand, contained in the herbarium of Vahl. There we found *Cassia Senna*, identical with the plant of the same name, which I had seen in the herbarium of Linnæus; further *C. angustifolia*, Vahl, with the inscription *C. lanceolata*, in Vahl's own hand. This I found identical with that in Willdenow's Herbarium in Berlin. The real *lanceolata* of Forskäl, however, we did not then find. During my last journey I looked over the different species of cassia in the British Museum, and again found that the English are the best conservators of botanical

treasures, for there I found at last, to my great astonishment, what I had so much missed in Copenhagen, namely, a perfect specimen *with fruits* of the narrow-leaved senna, with the inscription *C. lanceolata* (probably written by Sir Joseph Bankes, for by Forskäl's hand *C. Senna* only was written on it). *In this no glands could be discovered;* the leaves were somewhat more developed, but the whole habit perfectly agreed with that of *C. angustifolia*, Vahl. Besides this there was also a specimen of *C. ligustrina*, Forskäl, with the glands but without fruits. The dispute about the glands was the cause of the quarrel between Delile and De Candolle, and I cannot help agreeing with the first in denying the presence of glands in the officinal species; for in spite of many and laborious examinations of whole bales of stalks, I have as yet not been able to discover among senna-leaves in *commerce* stalks with glands. It was necessary, in the first place, to establish this fact; and I corresponded, therefore, lately with Professor Vahl, in Copenhagen. He sent me a leaf of a plant possessing glands, *C. lanceolata*, Forskäl, and upon which Forskäl is said to have written with his own hand *Surdud Senna.* Judging from the leaf, this plant is *C. ligustrina*, and it is very probable that Forskäl only wrote the above-mentioned name from oversight. It is, however, much to be regretted that this mistake crept into his *Flora Ægypt. Arabica*, and thus to the detriment of science has been promulgated in every manual. The leaves of this *C. ligustrina* are very like those of Tinevelly senna, but somewhat more pointed and (almost imperceptibly) finely ciliated at the edge. The fruit is a narrow, scymitar-shaped, curved, yellowish pod (*legumina linearia incurva*), very different from the officinal folliculi, and consequently not belonging to *Senna*. The fruit I saw for the first time in the specimen preserved in the Linnæan herbarium. Whoever has not seen and closely examined this plant, may easily mistake it for the full-grown Mecca and Tinevelly or East India senna.* The mistake of Forskäl, therefore (who had manifestly not seen and collected this plant when in fruit) may be readily excused; I cannot, however, omit to *correct his mistake publicly.*

The glands of the *C. ligustrina* are quite different from those which Nees has erroneously depicted as glands in the *C. lanceolata*, in the collection at Düsseldorf, and which Nectoux and Persoon, who were equally mistaken, also declared to be glands; for they are not glands, but only two hairy stipulæ subulatæ at the basis of either side of the petiole of the *C. acutifolia*, as in many other species of *Cassia* and *Wisteria.*† The glands of *C. ligustrina* and *C. glandulosa* L., on the other hand, arise at $\frac{1}{4}$ or $\frac{1}{2}$-inch distance from the bases, on the common petiole, from the hairy midrib, in the form of a small fungus of the size of a pin's-head, with a yellow stem and brown cap.

If we now pass to the principal question, Forskäl's plant as *C. lanceolata*, we find that (taking the specimen in the British Museum as the prototype), it is identical with *C. angustifolia*, Vahl, and with Mecca and Indian senna-leaves, and I therefore declare it to be *Senna angustifolia,*‡ which, as is well known, forms a part of the Alexandrian senna-leaves. *By this, therefore, the incorrect description of Forskäl, in his "Flora Ægypto-Arabica," the less accurate synonym C. lanceolata, and, above all, the error of De Candolle respecting the glands, are got rid of; for C. acutifolia*, Delile, cannot be confounded with it without further mistaking it for *Senna*

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* This appears to have been the case with Schrank in his Treatise (*In Acad. Monac.*) with *ligustrinoides.*

† As Delile, Bennet, and I regard them.

‡ Thomson, in 1828, regarded it in his *London Dispensatory* as the original plant of *Senna mekky* (*Mocha*).

acutifolia. It remains the original *officinal* species of Sennaar, and is distinguished by the more elliptic form of the slightly hairy midrib, and by its peculiar smell and acrid taste. I examined Dr. Kotschy's very perfect and beautiful specimen, sent in 1840 from Sennaar to the British Museum, the smooth, brownish-green follicles contained between the dissepiments showing wrinkled seeds with yellowish seed-lobes and an enamel-like coating. Nees, in the collection of Düsseldorf, has erroneously mixed this species with *C. Senna* and *C. lanceolata*, and thus only increased the confusion of the synonyms of these otherwise beautifully and correctly depicted plants.

C. Senna of Linnæus is the third species of which the Alexandrian leaves are composed, and out of respect for the authority of old Linnæus, by many ancient botanists considered as the prototype of the same. I can only consider it as the vehicle of all mistakes, which this name is intended to conceal. Most previous botanists have done the same (as Forskäl did with *ligustrina* and *lanceolata*) when tired of further examinations. I have found it identical with *C. obtusa* Roxburgh, *obovata* Colladon, *obtusata et obovata* Hayne. The leaves of this species vary much in form; all the more fully grown leaves are at the top broadly blunted (*obtusata*) and retuse (*retusa*) whilst the younger leaves present this characteristic less distinctly, and are more ovate (*subovata*, *obovata*). In commerce, this species has been very correctly named from this latter character, and I shall therefore call it *S. obovata*. The climate in which the *Senna obovata* grows, imparts to the leaf its peculiar consistency. The colour of the leaves is brownish green: those from Tripoli have a more delicate parenchyma than those from Saida and Aleppo; those from Senegal are thicker and more like leather. The smell of these leaves is inconsiderable; their taste when chewed, mucilaginous and herbaceous: the dark-green follicles, when ripe, have a contracted kidney-like form; the unripe ones, however, have a more bottle-gourd, rounded form, and after the production of the seeds, which are somewhat torulose, have crest-like vertical protuberances projecting in the middle, and the seeds have very yellow-coloured cotyledons.

That *Cynanchum Argel* materially increases the smell of the Alexandrian leaves, and is, therefore, intentionally mixed with them, is now an established fact; the pale-green leaves, whitish blossoms, and blackish fruit of this plant, which are found among the so-called officinal leaves (as imported by us) sufficiently mark their presence; and in order to suppress entirely this adulteration, I propose to cease buying this Alexandrian commercial sort, till the practice is given up.

The narrow-leaved *Mecca senna*, which I have designated *Senna angustifolia*, is mixed with the small felty leaves of a tender plant, which I discovered in it some time since; and having recently received it from Delile as a variety of his *C. acutifolia*, I now take the liberty to introduce it as *Senna tomentosa*. This plant is no shrub, but like the Mecca and Tinevelly senna, merely an herbaceous plant. It has, therefore, only very delicate, but not ligneous stalks, like the *Senna acutifolia* and *obovata*. It is impossible, in my opinion, to regard this *Senna tomentosa* as a variety of *acutifolia*, for not only the felt-like leaves and fruits, but also the whole habit, is much more delicate and different, while the leaves are *considerably smaller*, and of a more oval form, which certainly possesses a small point (*mucro*) but no bird's-tongue-like appearance, as *Senna acutifolia*. Delile accounts for this, by assuming that the hairy character is neither constant, nor a safe criterion when the leaves and fruits are perfectly developed, and I myself do not consider it of great importance; but still in one and the same bale of Mecca Senna these leaves and fruits are found in several stages; and although the fruits, *if the seeds be perfectly ripe*, have actually lost the blackish colour and part of the yellowish hair, still their upper

suture always remains, as I have had frequent opportunity of satisfying myself, and, contrary to what is the case with the follicles of *Senna acutifolia* and *angustifolia*, distinctly ciliated with fine hair ; and likewise the leaves, even when full grown (5—6‴ long and 3—33½‴ broad) are always felt-like and furnished with whitish hair. Darnaud sent this plant in 1843 to Delile from the valley of Dumrich in Nubia ; but Boré had previously discovered it in Arabia, and the bale which I examined had been imported from Yemen (in Arabia). At first I took these delicate small hairy leaves to be another sort (*Tephrosia Apollinea*) found in the Tripoli Senna, and which I had already met with in 1828 ; but I soon convinced myself, by examining the fruits mixed with it, and comparing it with Darnaud's specimen, that it was a real *senna*.

The Tripoli leaves consist, according to my examination, of *Senna acutifolia*, *S. obovata*, a trifling addition of *S. angustifolia*, and occasionally, as I found in 1828 and again in 1840, of the leaves of *Tephrosia Apollinea*, which, not being as constant as the adulteration of the Alexandrian leaves with *Cynanchum Argel*, I am inclined to consider as accidental. This plant is perfectly well figured in Delile's *Flore d'Egypte*, page 144, and described by him as *Galega ;* the delicate hairy leaves are soft, green, oblong, ovate, and, therefore, not easily to be distinguished from those of *S. obovata*, if this were not facilitated by the narrow, yellowish, hairy pods, which I found among them. I sent it at that time to Nees, who confirmed my views, and mentioned this adulteration at the meeting at Dusseldorf.

I now come to the fifth commercial sort, *viz. :*

The East Indian senna, which I consider as identical with that cultivated by Mr. Hughes in Tinevelly, near Calcutta ; and, therefore, in consonance with Royle and Wallich, I admit it as *Senna angustifolia*, the first of whom showed it to me beautifully drawn as *lanceolata*, Forskäl, in his *Illustration of the Botany of the Himalaya Mountains*. It appears that by care and cultivation the leaves of *S. angustifolia* here become broader and longer, for this Tinevelly senna is exactly one-third wider and longer than the leaves of the same species of senna growing wild in the East Indies and in Arabia. The colour is also deeper green, which, however, arises from the care taken in drying them ; for whilst the senna in Tinevelly is cultivated, and the leaves, like those of tea, gathered only when perfectly developed, the Indian gatherer mows the wild-growing leaves (whilst yet imperfectly developed, and therefore whilst narrower and smaller) like hay with us, and leaves them all exposed to the air and moisture ; and whilst they are yet for the most part not dry, they are pressed together in bales, where they undergo a fermentation. This is distinctly shown by the burnt black, and, by the oxidation of the Cathartin, yellow leaves. The proof that this colour is not the natural one is furnished by the fact, that the above-mentioned Tinevelly leaves, and the more carefully collected pure Yemen and Mecca leaves, which come from the same plant, are, since the abolition of the monopoly, received direct from these parts, in a more beautiful condition than were formerly procured by way of Cairo. They are also justly to be preferred to those East Indian yellow leaves ; for although Pomet, in his work written in 1688, prefers the yellowish senna leaves to all others, still he would have rejected them, because they represent as narrow-leaved senna (*de la pique*) the Mecca leaves, against which he pronounces, without further examination, the anathema, as well as against the green leaves (*obovata*) from Tripoli and Saida, with the intention of praising above all others the Alexandrian leaves, which were at that time probably not so much mixed with other leaves and the Cynanchum as now.

It was only after long-continued personal examination and inspection of the dried original plants, that it has been possible to elucidate finally

this obscure part of the materia medica; and I shall consider myself very happy if I have succeeded in this task.

Senna.

Familia *Leguminosæ*, tribus *Cassiæ*. *Decandria Monogynia*. Calyx pentaphyllus, petala quinque æqualia; antheræ supremæ tres steriles, infimæ tres radiatæ filamentis longioribus incurvis, petiolis *eglandulosis*, *foliolis basi obliquis*. Folliculi oblongi vel reniformes, lati, plano-compressi, margine membranaceo. *Semina* (parietalia, cum *dissepimentis*) cordata, tunica torulosa. *Podospermio*, sutura supera et hilo ovali conjuncto, cotyledonibus flavis, radicula et plumula coronatis.

1. S. obovata: foliis pinnatis, tri-quatuor vel quinquejugis, foliolis *obovatis retuso-rotundatis*, mucronatis, basi angustioribus; folliculo supra semina verticaliter interrupto *cristato*. Seminibus *verticaliter torulosis*.

Syn: *Cassia senna*, Linnæi, sp. pl. 1, p. 559. Nectoux *Voyage d'Egypte*, tab. 1, page 19. Burmann, *Flor. Ind.*, page 96, t. 33. Sieber *Flora Ægyptiaca*, et Delile *Flore d'Egypte*, fol. 420.

Cassia obovata et *obtusata*, Hayne. *Düsseldorf Abbild. Consp.*, 347.

Cassia obtusa, Roxburgh, *Flor. Ind.*, 2., p. 344.

Cassia portoregalis, Bancroft.

Cassia Senna, Lam. ill. 1, 332.

Cassia obovata, Colladon, *Hist. des Cass.*, p. 92.

Cassia senna Italica, Linn., sp. pl. ed. ii, i. p. 539.

Frutex habitat in Syria, Ægypto, Senegalia, Tripoli et India.

Senna de Aleppo in commerc. dicta.

2. Senna angustifolia. Foliis pinnatis, quinque septem-jugis, foliolis *angusto-lanceolatis*, glaberrimis subæqualibus, folliculis planis compressis oblongis et reniformibus.

Synon.—*Cassia angustifolia*. Vahl. Symb. Willdenow in *Herb. Berolin.*

Cassia Senna, Dr. Wallich, missa in *Horto Botanico Calcuttæ Colitur.*

Cassia Indica, Schumacher *Plantelare*, t. i., page 577.

Cassia elongata, Lemaire Lisancourt.

Cassia acutifolia, Düsseldorfer Sammlung *exclus. Synonymis Consp.*, 346.

Cassia lanceolata, Forskäl, in Mus. Britan., exclus. description in *Flor. Ægypt. Arab.*, page 85, No. 58.

Cassia lanceolata, Dr. Royle, in the *Illustration of the Botany of the Himalayan Mountains*, tab. 37.

Cassia lanceolata, *Herb. Wightii*, No. 654 in Mus. Brit.

Habitat in Arabia, in Lohaya, Mecca, Yemen, et in India. In Calcutta, Tinevelly prope colitur.

Senna de Mecca in commerc. dicta.

3. Senna acutifolia. Foliis pinnatis quinque-jugis stipulis linearibus subulatis et pilosis ad basin petiolorum, *foliolis ovato-acutis* æqualibus nervo medio in adolescentibus piloso; folliculis oblongis plano-compressis.

Synonym: *Cassia acutifolia*. Delile *Flore d'Egypte*.

Cassia lanceolata. Düsseldorf, Sammlung, *exclus. Synonym. Consp.*, 345.

Cassia lanceolata. Dr. Kotschy, in Mus. Brit., No. 315.

Frutex habitat in Ægypti et Sennaar. *Cassia Alexandrina*. Miller.

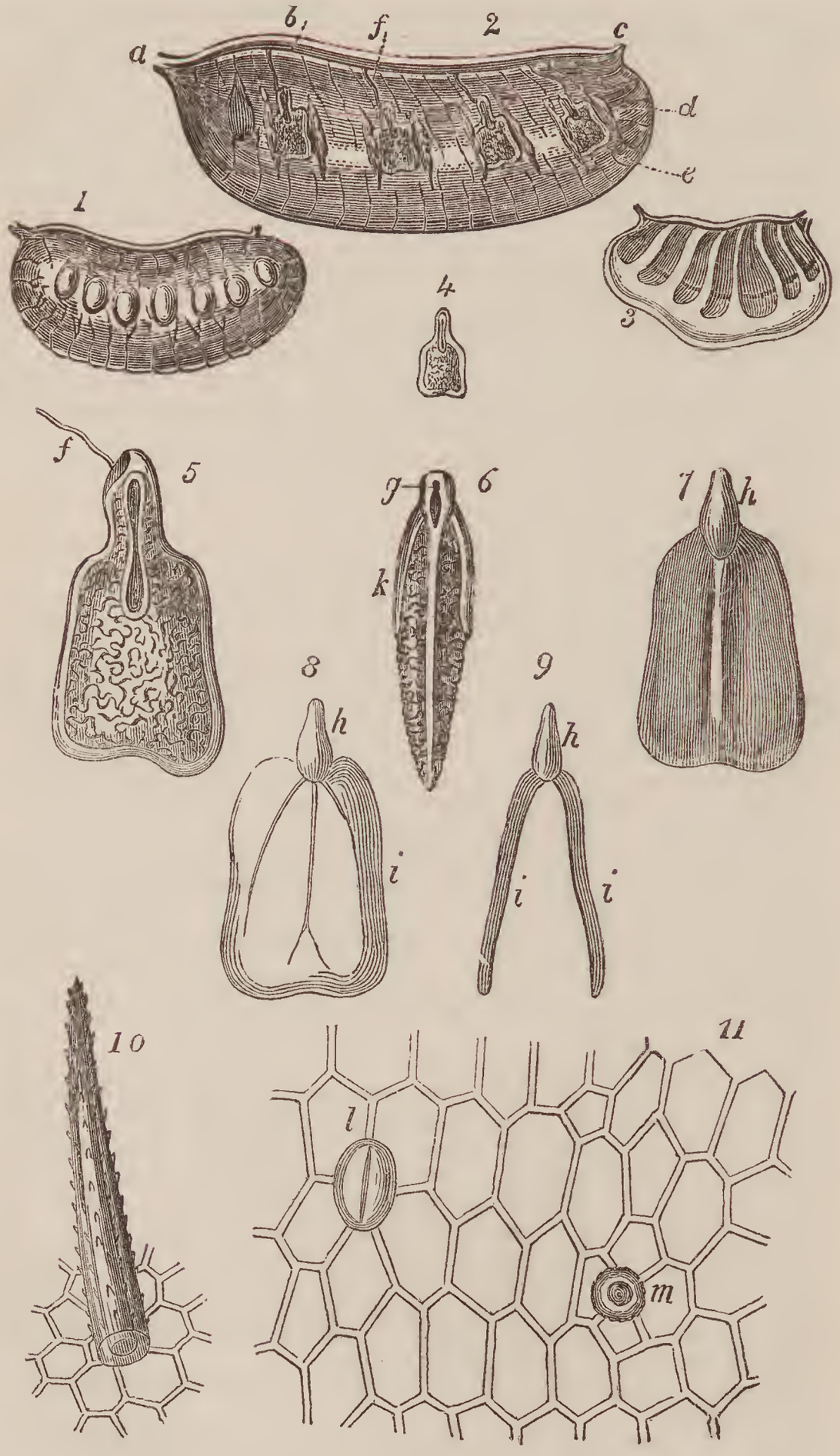
Senna Alexandrina et officinalis in com. dicta.

4. S. tomentosa. Foliis pinnatis quinque-jugis foliolis parvis *ovato-oblongis*, pilosis mucronatis, folliculis adolescentibus nigris, velutinis; maturis sutura superiori pilis albidis ciliata.

Synonym: *Cassia ovata*, Merat et Lens? *Cassia acutifolia* varietas *tomentosa* Delile.

Habitat in Arabia et Nubia, inter folia *Sennæ Meccensis* ab auctore detecta et a clariss. Boré in Arabia et a clariss. Darnaud in Valle Dumrich in Nubia collecta.

Sennæ de Mecca in commercio dicta.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EXPLANATION OF THE FIGURES.

Fig. 1. A young and hairy follicle of *S. tomentosa* Delile (natural size).

Fig. 2. A full-grown follicle of *S. angustifolia* with four seeds *e*, which are connected with the upper suture *b*, by the funiculus *f*. *a* the stalk, *c* the remains of the stigma, *d* dissepiment.

Fig. 3. The inner side of a wall of a follicle of *S. obovata*, with the transverse and longitudinal folds.

Fig. 4. Seed (natural size)

Fig. 5. The same magnified and viewed laterally. *f* the attached funiculus.

Fig. 6. The same viewed edgeways. *g* the small aperture (micropyle, hilum.)

Fig. 7. Cotyledons with embryo *h*.

Fig. 8. The same viewed from the inner surface *i*, with the embryo *h* or radicle.

Fig. 9. Longitudinal section of the cotyledons *i*, in order to show their attachment to the embryo *h*.

Fig. 10. A hair of the follicle (magnified).

Fig. 11. Outer-coat (tunica) of the follicle magnified. with the stoma *l*, and the bed *m* of the fallen hair.

FERMENTED PHARMACEUTICAL PREPARATIONS.

BY BUTLER LANE, M.D.

I BEG to direct the attention of your numerous pharmaceutical readers to a new and peculiar method of medicinal preparation, which I think will soon receive the sanction of the medical profession, and is calculated to supply a desideratum in Pharmacy. It consists in the application of fermentative action, with the view to effect the solution and preservation of the active principles of different drugs; I believe that these objects may be thus effected more economically, perfectly, and permanently, than by our present infusions, decoctions, and tinctures. The process is thus carried out: 1stly, By obtaining an aqueous solution, more or less perfect, of the active medicinal principles; in some instances the active matter will perhaps, in the first place, be merely suspended or mechanically diffused through the aqueous menstruum. 2dly. By adding sugar in the proportion of at least three parts to eight, in order to afford pabulum for the formation of alcohol. 3dly. By exciting active fermentation by the admixture of yeast, and the equable maintenance of a warm temperature (65° to 75°) during a period of from four to eight weeks. 4thly By clearing and fining the vinous liquor, and then placing it in closed vessels ready for use.

I have applied the fermenting process to numerous drugs, and have succeeded in obtaining elegant and efficacious preparations, in many respects superior to any others in use, and which have been highly appreciated by those who have given them a trial. Senna, opium, gentian, rhubarb, bark, hemlock, henbane, ipecacuanha, valerian, foxglove, catechu, aloes, squill, calumba, cascarilla, hop, sarsaparilla, &c., are available for the process, which is, however, much more facile of application in some instances than in others. I intend giving full details at a future period, and shall be happy to afford any information in my power to any one who may think proper to apply to me on the subject.

Ewell, Surrey, June 15th, 1849.

GLYCERINE.

The employment of glycerine as an application in the treatment of deafness, and also for other purposes as a medicinal agent, has given rise to inquiries on the subject, on which account a few practical remarks may probably be interesting to some of our readers.

Glycerine is one of the products of the saponification of fat oils. It is produced in large quantities in the soap manufactories in a very impure state, being contaminated with saline and empyreumatic matters, and having a very strong disagreeable odour. In order to obtain glycerine from this source the residuary liquors are evaporated and treated with alcohol, which dissolves out the glycerine. The alcohol having been separated by evaporation, the glycerine is diluted with water and boiled with animal charcoal. This process must be repeated several times, or until the result is sufficiently free from smell. It is, however, extremely difficult to obtain pure glycerine from this source on account of the nature and condition of the ingredients usually employed in soap making, which it is almost impossible to deprive of rancid odour.

The best method of obtaining glycerine for medicinal purposes is to evaporate the water used in making emplastrum plumbi. When the oil employed is fresh, and the process is carefully conducted, the result is easily made fit for use, and is almost without odour. Any lead with which it may be contaminated, is separated by passing a stream of sulphuretted hydrogen through it when in a dilute state. The excess of gas escapes during the process of evaporation. If requisite it may be boiled with animal charcoal, filtered, and evaporated. The specific gravity, when reduced to the proper consistence, is 1.27.

GLYCERINE
AS AN APPLICATION IN CASES OF DEAFNESS.

It is now about twelve months since an announcement appeared in the medical journals respecting a new cure for deafness, discovered by Mr. Yearsley. The remedy was reported to be perfectly simple, remarkably safe, and very effectual. Several papers by Mr. Yearsley appeared in the *Lancet* during July and August, 1848, and from the statements therein contained, it appeared that the novelty consisted in the insertion of a piece of moistened cotton wool into the ear in a particular manner. In answer to the intimation that he "had not so fully described the *modus operandi* as to enable others to adopt it with more than a mere chance of success," Mr. Yearsley observes, "In answer, I have only to say, that the experience of several years has taught me that it is impossible to convey to others, in words, such explicit directions as shall enable them to manipulate with any degree of certainty. In fact, it was on this account that I have so long held back from publishing any account of the remarkable fact I had observed in my practice." He also stated that he would have much pleasure in demonstrating his method personally to medical men who might feel interested on the subject.

In subsequent articles Mr. Yearsley describes minutely the mode of introducing the moistened cotton, with the instruments which he has

contrived for that purpose. No information, however, was given at that time respecting the agent employed for moistening the cotton.

Among the leaders of the *Lancet* of July 22, we find the following remarks:

"A note from a highly-respectable Physician, printed at p. 110, and testifying to the extraordinary efficacy of the new mode of treating deafness, described by Mr. Yearsley, will be read with interest by the Profession. We have ourselves seen the remedy applied by Mr. Yearsley in several cases of apparently incurable deafness, and in some of those cases the effects produced appeared to be almost miraculous. This happy discovery establishes for our profession another claim to public gratitude and respect."

The *Medical Gazette* of June 1st contains a letter from Dr. Turnbull, of which the following is an extract:

"Mr. Yearsley has lately recorded some very interesting cases of recovery from deafness, when the tympanum was partially destroyed, by the introduction of 'a pellet of moistened cotton-wool gently pushed down the meatus with the point of a probe.'

"Mr. Yearsley states that the application is necessary to be renewed daily, in consequence of the pellet of cotton-wool becoming dry, which it does generally in twenty-four hours.

"This great inconvenience I have found is much done away with by the wool being moistened with glycerine alone, or diluted with water. The glycerine possesses the peculiar property of attracting moisture from the air, and keeping the wool moist for a length of time, thereby rendering it unnecessary to have it frequently changed.*

"Another method that I have practised in cases of fractured or perforated tympanum for the last ten years, and I think with great benefit, is by dropping ten drops of glycerine into the ear, or a solution of glycerine and water of equal quantities, causing the patients to lay their heads down upon the contrary side for the space of about five minutes; and two or three times when in this position, causing the patient to make a forcible pressure of air against the cheek, at the same time compressing the nose with the fingers. The air will then be forced out of the ear through the eustachian tube, and all that is required in general is to repeat this as often as the deafness shall return. I have had some cases that did not require a second application for several months.

This elicited a communication in the *Medical Gazette* of June 15th, from Mr. Thomas H. Wakley, who states,

"I think it right to state that glycerine, as a remedy for deafness, has been used by me upwards of twelve months. I obtained the preparation from Mr. Lloyd Bullock, of Conduit Street, who was so obliging as to manufacture it for me. Many months since I stated that I successfully employed glycerine to Mr. Erasmus Wilson, Mr. Gay, Mr. Needon Cooke, and others; amongst the latter was Dr. Turnbull himself, on whose letter any comment is unnecessary."

In the *Lancet* of June 16th is a further communication from Mr. T. H. Wakley, giving a detailed account of this mode of treatment. The article commences with a few general remarks on the manner in which discoveries are received by the public, followed by an allusion

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* Glycerine does not undergo any change by keeping. It does not ferment like other syrupy liquids.

to Mr. Yearsley's new method of treating deafness, and a kind of apology for having adopted that method at the Royal Free Hospital, in compliance with the request of numerous patients, who had heard of the discovery. Mr. Wakley observes "The adoption of the plan of treatment recommended by Mr. Yearsley was an appropriate recognition of the value of his labours."

In the *Lancet* of June 23, Mr. Wakley gives additional instructions for the application of glycerine, and observes,

"A further experience of the effects of glycerine, since the case reported in March was written, has induced me to believe that I have claimed much less credit for that agent than its merits deserve. In several cases of deafness of very long standing, and in which the aural passage and tympanum exhibited a white polished appearance, and the external meatus had become hard, horny, and entirely deprived of its natural functions; the glycerine, patiently applied, daily, has proved of the utmost advantage by restoring the parts to their natural condition, and by reproducing the ceruminous secretion of the organs."

From the above statements, corroborated by the evidence of other Medical Practitioners who have employed the application or witnessed the results, it appears that glycerine is a valuable and important agent as an application in cases of deafness. It also appears that the merit of the discovery, as in other cases of the kind, is a disputed point. We hope the claimants to this honour will not become involved in so serious a controversy as that which arose between the discoverers of the inhalation of ether, one of whom lost, first his reason, and ultimately his life, as a result of the excitement.

THE PRESERVATION OF LEECHES.

BY MR. C. E. ASHBY (DENTIST).

Many of the readers of your Journal may be unaware of an extremely simple method of preserving leeches clean and healthy, which I have found to answer exceedingly well. It is as follows :

At the bottom of the jar containing the leeches place a layer, about half-an-inch thick, of common sand (such as is used for domestic purposes), after washing it in several waters to remove any soluble or extraneous matter.

125, *Newgate Street.*

ON THE CINNAMON REGION OF EASTERN AFRICA.

BY MR. W. D. COOLEY.

The eastern angle of Africa was at a very early period named, from its exchangeable produce, Aromata ; and from the Straits of Bâb el Mandel to Cape Gardafui, we then meet in succession the *Regio Myrrhifera*, *R. Libanotophora*, and *R. Cinnamonifera*. In the classic ages of Greece and Rome, the belief was general that most spices were derived from Arabia Felix or Yemen, the country of the Sabæans, in a later age called Hymiarites, or Homerites. But a careful examination of ancient authors, proves that the Sabæans were but the *carriers*, not the producers, of these aromatics. Herodotus includes under the general term Arabia the whole territory east of the Nile, and in giving his semi-fabulous account of the mode of collecting cinnamon, had included not the peninsula of Arabia, but the African

part east of the Nile. Besides Herodotus, a long list of ancient authors may be quoted as supporting this view of the subject ; viz., Eratosthenes, Strabo, Pliny, Ptolemy, Arrian (the author of the *Periplus*) Philostorgius, Cosmas, Indicopleustes,—all of whom agree in placing the region of Cinnamon at the eastern extremity of Africa. Theophrastus (the disciple of Aristotle), Galen, and Dioscorides, all state that the best cinnamon was derived from Mosyllum. Arabia Felix owed its great prosperity to its carrying trade ; and in Ezekiel we are informed that the Sabæans traded in Tyre "with the chief of all spices." In the inscription of Adulis (A.D. 330) copied by Cosmas, mention is made of "the tribes of the Rausi, who occupy the immense plains adjacent to the region of Frankincense;" and we have no difficulty in recognising in these Rausi the present Arusi, occupying the hills around the sources of the Webbe, and who are described as one of the great tribes of the Gâla. The commerce of this country underwent, at length, the most violent changes, and the original population has been driven back by the influx of Arabs and Mohammedan tribes (the Somâli). In an Egyptian papyrus dating as far back as the reign of Menephthah the Third (B.C. 1100), Dr. E. Hincks has discovered a mandate respecting the purchase of aromatics from the land of Arus or Arusa ; and in coupling the local name and the merchandize, we can but conclude that Egypt three thousand years ago obtained a supply of aromatic drugs from the Analitic Gulf. This fact throws perhaps some light on the historical tradition "that Sesostris led an expedition to, and left graven monuments in, that quarter." That a country named at so early a period from its valuable produce, should lose so important a trade, may be attributed to the following causes :—1. The fall of Egyptian civilization and of Paganism, on the customs of which depended the consumption of the aromatics. 2. The revolutions in the countries around the Red Sea accompanying the spread of Mohammedanism,—with the impeded intercourse between the Christian and Mohammedan worlds. 3. Discovery of the route to India round the Cape of Good Hope, and the consequent shifting of the channels of commerce. 4. The wanton destruction of the towns on the shores of the Red Sea by the Portuguese, and the implacable hatred therefore conceived by the natives towards Christians. The ancients and the Arabs appear to have known nothing concerning the cinnamon of Ceylon, though the latter speak of that of Malabar. Arrian, in his *Periplus*, mentions Malao and Mundi (perhaps the sites of Zeylah and Berbera) and Mosyllum as the most important places on the coast. "From this neighbourhood is exported a large quantity of cassia, in consequence of which, this port requires ships of a larger size." Further on, he mentions Acannæ (Buraidi, E. of Ras Ululah) ; then, doubling Cape Aromata, he names Tabæ (near the Wadi Tohum) "where the country produces much spice, &c." Arrian afterwards names Opone (Hafoon) "which port was visited by the ships from India, bringing the cane honey, called Sacchari." Ancient authors add, however, that cinnamon and cassia came from the interior. Hence, Ptolemy filled up the blanks in his maps between the frequented coasts and the sources of the Nile, which he adopted from Marinus Tyrius, by placing the cinnamon country above those sources, while he fixes the Region of Myrrh, which is, in truth, the Wadi Nogal, at the sources of the Astapus. If, therefore, the design be entertained of exploring this in many respects highly interesting country, there can be no doubt as to the limits within which may be confined the labours of the expedition, the chief object of which is to become acquainted with the aromatic productions of the land. All these will be found in the angle cut off by the Wadi Nogal, or in the limestone mountains of the Singheli and Mijjerthein tribes, between Ras Gulwaini and Hafoon. South of this region begins the Khazain (the Azenia of the ancients),—that is, the

sandstone mountains and the desert. Within the limits here pointed out, on the south-western face of the mountains, at a moderate elevation, will probably be found the Laurineæ sought for, together with a great variety of aromata (spicy drugs), enodia (perfumes), and thymiamata (kinds of incense), many of which are named, but not described by the ancients.—*Athenæum.*

ON ANHYDROUS NITRIC ACID.

BY M. DEVILLE.

M. Dumas presented to the Academy, in the name of M. Deville, Professor of the Faculty of Sciences at Besançon, the first results of his researches on the action of chlorine on the anhydrous salts which oxide of silver forms both with organic and inorganic acids.

By treating nitrate of silver with perfectly dry chlorine, M. Deville has succeeded in isolating anhydrous nitric acid, the existence of which was demonstrated by numerous analyses. This beautiful substance is obtained in colourless crystals, which are perfectly brilliant and limpid, and may be procured of considerable size ; when they are slowly deposited in a current of gas rendered very cold, their edges are a centimetre in length. These crystals are prisms of six faces, which appear to be derived from a right prism with a rhombic base. They melt at a temperature not much exceeding 85.5° F. ; their boiling-point is about 113° ; at 50° the tension of this substance is very considerable. In contact with water it becomes very hot, and dissolves in it without imparting colour, and without disengaging any gas ; it then produces with barytes the nitrate of that base. When heated its decomposition appears to commence nearly at its boiling-point. This circumstance is an obstacle to the determination of the density of its vapour by the process of M. Dumas.

The process by which M. Deville obtained anhydrous nitric acid is very simple ; but the readiness with which it penetrates tubes of caoutchouc renders it necessary to unite all the pieces of the apparatus by melting them. The following is the process :—the author employs a U-shaped tube capable of containing 500 grains of nitrate of silver dried in the apparatus at 356° F. in a current of dry carbonic acid gas. Another very large U-tube is connected with this, and to its lower part is attached a small spherical reservoir ; it is in this reservoir that a liquid is deposited which always forms during the operation, and which is excessively volatile (nitrous acid ?). The tube containing the nitrate of silver is immersed in water covered with a thin stratum of oil, and heated by means of a spirit-lamp communicating with a reservoir at a constant level. The chlorine issues from a glass gasometer, and its displacement is effected by a slow and constant flow of concentrated sulphuric acid. The chlorine must afterwards pass over chloride of lime, and then over pumice-stone moistened with sulphuric acid. At common temperatures no effect appears to be produced. The nitrate of silver must be heated to 203° F., the temperature being then quickly reduced to 136° or 154°, but not lower. At the commencement, hyponitrous acid, distinguishable by its colour and ready condensation, is produced ; and when the temperature has reached its lowest point, the production of crystals begins, and they soon choke the receiver cooled to 6° below zero ; they are always deposited upon that part of the receiver which is not immersed in the freezing mixture, and M. Deville states that ice alone is sufficient to occasion their formation.

The gases are coloured, and the small sphere of the cooled tube contains a small quantity of liquid, which must be taken from the apparatus before the nitric acid is removed to another vessel ; this latter operation is readily effected by replacing the current of chlorine by one of carbonic acid. The

condenser is then to be no longer cooled, and the vessel for receiving the crystals is to be immersed in a freezing mixture ; this is fastened to the producing apparatus by means of a caoutchouc tube furnished with aminthus. The chlorine should pass very slowly, at the rate of about three or four litres in twenty-four hours. All the gas, however, is not absorbed by the nitrate of silver. Oxygen is evolved, the volume of which appears to be equal to that of the chlorine employed. An apparatus thus constructed operates day and night without watching, care being however taken to renew the sulphuric acid which displaces the chlorine, the spirit of the lamp, and the ingredients of the freezing mixture.

The author states that he shall forward hereafter a more complete memoir, in which he will describe the chemical properties of the anhydrous nitric acid, and detail the results of his researches on the action of chlorine and hypochlorous acid on the salts of silver.—*L'Institut*, Fevrier 21, 1849.

COMPOSITION OF LIME-WATER.

BY G. C. WITTSTEIN.

The proportion of lime in lime-water was determined by Wittstein to be as follows :—732 parts of cold water dissolve one part of anhydrous lime. The experiments to determine the solubility of lime in boiling water differed in their results ; in three experiments one part of anhydrous lime required respectively 1495 parts, 1570 parts, and 1311 parts of boiling water. The carbonate of lime which deposits in the open air from the lime-water is the neutral carbonate Ca O, CO_2.—*Buchner's Repertorium.*

ON THE DETECTION OF CHLOROFORM IN THE BLOOD.

BY RAGSKY.

The presence of chloroform cannot be readily detected by chemical means in the blood, on account of the very small proportion contained in the circulating fluid ; for after inhalation a few drops of chloroform have become mixed with about thirty pounds of blood contained in the body. The author, therefore, invented the following process, by which he succeeded in detecting the presence of chloroform in the blood ; employing for his experiment at least one ounce of blood, either just abstracted from the body, or which had been carefully preserved in a well-closed vessel subsequent to its abstraction.

This method is founded on the fact, that chloroform is decomposed by a red heat into carbon, muriatic acid, and chlorine. His process consists in introducing the blood which is to be examined into a flask, the cork of which is perforated by a curved glass tube. The horizontal portion of this tube is made red hot during the experiment. Into the extremity of the tube a strip of paper, coated with iodide of potassium and starch-paste, is introduced. The flask is then placed in a water-bath, and the water is made to boil in order to volatilize the chloroform, which is decomposed in the red-hot portion of the tube ; and the chlorine thus set free, re-acting on the iodide and paste, produces a blue colour. By this test the millionth part of chloroform can be distinctly discovered. The author has made repeated experiments with the blood of healthy and diseased individuals, who had not inhaled chloroform, without obtaining the same result.

The narcotism from chloroform is, according to the author, more lasting than that from ether ; the cause of this may be that the boiling point of chloroform is higher than that of ether. On the other hand, the narcotism of the first is followed by a greater relaxation. The author believes that

the cause of the narcotism is the circumstance, that the vapours of the ether and chloroform possess a much higher degree of tension than the vapour of water, and, therefore, replace the latter in the organs. Most organic substances contain much water; the lungs, the liver, &c. &c. about 75 per cent. The increased pressure which the vapour of ether or chloroform exercises may, therefore, be the cause of the narcotism.—*Journ. für Prakt. Chem.*, Bd. 46.

ON THE CHANGE WHICH A SOLUTION OF PROTOSULPHATE OF IRON UNDERGOES IN THE AIR.

BY G. C. WITTSTEIN.

The change which this solution undergoes in the air is generally admitted to consist in the formation of a precipitate of 2 Fe O_3+SO_3. This, however, Wittstein says is not the case. A solution of one part of protosulphate of iron in four parts of water kept for eleven months in a lightly covered vessel, gave a precipitate which, on analysis, yielded the following result :

	Experiments. I.	Experiments. II.	Atoms.	Calculations.
Fe O_3	46.50	46.30	2	45.45
S O_3	33.19	33.43	3	34.10
H O	20.31	20.27	8	20.45
	100.00	100.00		100.00

According to this the precipitate is 2 Fe O_3+3 SO_3+8 HO.

The liquid filtered from this precipitate deposited a further precipitate in four weeks, which had the same composition. The liquid filtered from this second precipitate still contained much protosalt, although only half an ounce of sulphate of iron had been employed for the experiment. After fifteen months' exposure scarcely a third part of it had been changed into a persalt.—*Buchner's Repert.*

HYDRAULIC CEMENT.

Powdered furnace slag, mixed with burnt lime, furnishes, as is well known, an excellent hydraulic cement; and Elsner proposes a test to discover easily those slags, and also minerals, which are best suited for the manufacture of cement, namely, those which when powdered and treated with muriatic acid, yield in the shortest time *siliceous jelly.—Pharm. Central Blatt.*

ON XYLOIDIN AND GUN-COTTON.

Xyloidin, and still more so gun-cotton (*fulmi-cotton*), are idio-electries, and by friction with the dry hand, become to a high degree negatively electric. Clothing (as shirts and jackets) manufactured from this material, and worn on the bare body, must, therefore, exercise a medicinal effect by the electricity which they produce through the friction of the skin, and a Chemist in Russia has recommended the use of shirts, &c., made of calico and similar materials, which has been steeped in a mixture of nitric and sulphuric acids, or of nitre and sulphuric acid.—*Med. Zeitung Russlands*, 1846, N. 28.

The application of gun-cotton for such purposes is, however, very dangerous, since the spontaneous combustion of the same is often caused by the slightest circumstances.—*Buchner's Repertorium.*

LETTER FROM AN ASSOCIATE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—May I be permitted to occupy a small space in your Journal by a few remarks on what I conceive to be a stigma cast on the character of the Associates of the Pharmaceutical Society—of those more especially who are resident in London. It has often been remarked, that the attendance at the Lectures has fallen short of the expectations of those by whom they were promoted; it also appears to be generally assumed that this lack of attendance arises from indifference on the part of those for whose benefit they are instituted. This I respectfully submit to be an erroneous opinion. I feel satisfied, both from observation and from several years' experience in London, that the evil springs from another source, that the fault lies more with the Members than with the Associates. Believe me, Sir, the horses require no *leading* to the intellectual fountain; they only require the halter to be loosened and they will speedily gallop to quench their thirst; give them the time and opportunity, and the Council will have but little cause to complain of empty benches. The fee never was an obstacle—never, that I am aware of, a cause for complaint, and I hope will never be reduced. The Associates require no such incentive; all they want is time: and if they are expected to be philosophers, give them the opportunity of becoming such; tantalize them not by holding the standard of scientific acquirement beyond their reach, and then by reproaching them for not grasping it. What is the general routine of a London shop? Is not the Assistant required to be behind the counter at 7 A.M., there to remain until nearly midnight? and, whilst there, unless my experience deceives me, has but little opportunity even for reading, to say nothing of study. Under such circumstances the advantages offered by the Society must remain to the majority a nonentity. The time, too, at which the Lectures are delivered is that at which they are expected to be dusting and arranging the shop for the business of the day—a time of all others to them the most inconvenient. Their masters but seldom endeavour to induce them to attend the means of instruction, but, on the contrary, too often raise obstacles to the expressed desire of doing so; reading is looked upon by too many of them as being prejudicial to their interests, and seems to be considered a misapplication of the time and energy for which they have to pay their servants. This may appear to you, Sir, to be short-sighted policy, but it is nevertheless too true. There may be, and doubtless are, some few honourable exceptions, but alas! how few are they in comparison with the number of Chemists in the immense metropolis! Might I suggest that the hour of the delivery of Lectures should be changed; and if they are intended for the benefit of the Assistants, let the interested parties be consulted, to ascertain what time would be most convenient to the majority of them. In large establishments, such as that, Sir, with which you are connected, where several young men are employed, they, by a little mutual accommodation, can make such arrangements as will enable them to comply with the existing state of things; but in the greater number of shops compliance is impossible. Such, Sir, is my view of the subject: if I am wrong, perhaps you will be kind enough to correct me; but if I am right, I hope we shall in future hear less of the apathy of the Assistants.

I remain, Sir, yours most respectfully,

Wm. Hepworth.

43, *Burlington Street, Manchester, June 15th*, 1849.

MEETING OF PHARMACEUTICAL CHEMISTS AT LIVERPOOL.

On Monday afternoon, June 4th, a Meeting of the Chemists of Liverpool and its vicinity was held at the Queen's Hotel, Lime Street, having been called by the Editor of this Journal, whose object was to give some account of the proceedings of the Pharmaceutical Society, with other matters in which the interests of Chemists and Druggists are concerned.

The Meeting was numerously attended, between forty and fifty gentlemen being present, including some Members of the Pharmaceutical Society from Manchester, Chester, and other neighbouring towns.

Mr. Edward Evans having been called to the chair, introduced

Mr. Jacob Bell, who having stated in general terms the object of the Meeting, observed, that the Pharmaceutical Society was a comprehensive institution, its Members being spread over England and Scotland, and some parts of Ireland, while its proceedings, being chiefly conducted in the metropolis, were imperfectly known to those residing at a distance, and he was therefore glad of the opportunity of stating a few facts which he thought likely to excite some degree of interest in the minds of the Members at large. The advantages resulting from the union, which had existed for about nine years, had been made manifest on numerous occasions; and it was now in his power to demonstrate, by an appeal to facts, the accuracy and soundness of the principles on which the Institution had been founded. The original stimulus which had led to this union was a threatened invasion of the privileges and independence of the trade; and when this evil had been warded off by the vigorous efforts of the London Chemists, those who had been engaged in the undertaking considered it absolutely necessary to found a permanent Society, having a representative Council ready to act with effect on any future emergency. The ultimate object in view was an Act of Parliament, recognising the Chemists as a qualified body, protecting them against aggression, and raising their scientific character. To effect this object it was necessary to establish a standard of qualification, and to provide the means of improvement for the Members as well as their successors. A School of Pharmacy, therefore, was founded; and the improved position which the Chemists had assumed might be attributed to the efforts which had thus been successfully made, during the last eight or nine years, to promote the acquirement of knowledge and raise the qualification of dispensers of medicine. In fact, protection could only be claimed or anticipated on the ground of improved education. At a recent interview of a deputation of the Society with the Lord Advocate, on the subject of the draft of a Pharmaceutical Bill which the Council were desirous of introducing to his notice, an allusion was made to the School of Pharmacy and the examinations of the Society. To this the Lord Advocate replied, that he was fully aware of what had been done by the Society in promoting education. It was on this ground only that he could entertain any proposition from the deputation. In the absence of such educational measures he might as well attempt to legislate for the bakers or butchers, or any other class of tradesmen, as for the Chemists. But, on the strength

of the professional qualification sought to be acquired by the Chemists, the subject might properly be entertained as a collateral branch of the Medical Reform question.

As a further illustration of the connexion between education and protection, Mr. Bell adverted to the Apothecaries' Hall of Liverpool, a concern which, although probably insignificant, and reported to be on its last legs, had nevertheless occasioned some degree of annoyance and injury to the Chemists in that locality. The pretext upon which this establishment had been founded was the allegation that Medical Practitioners could not depend upon the accuracy of Chemists, or the purity of their drugs, and that it was therefore necessary, for the safety of the public, to form a Company of Apothecaries, who should conduct this branch of business. However unfounded this sweeping charge might have been, it was impossible to refute it, because it could not be denied that many persons were carrying on business as Chemists who had passed through no education, and that their medicines were in many cases bad or adulterated. Although it could be proved on the other side that other persons were well qualified for their business, this did not invalidate the imputation, as it still remained an open question whether qualification was the exception or the rule. Consequently the whole trade suffered on account of the delinquency of those who, if a salutary law had existed, would not have been allowed to assume the name of Chemists. If the Pharmaceutical Society had been flourishing at that time, providing education and evidence of qualification, with a boundary line between the parties so qualified and uneducated persons, was it likely that the Board of Trade would have sanctioned a joint-stock company for dispensing medicines? The legitimate object of such companies was to carry out great undertakings beneficial to the public, and requiring much capital and combined influence. But the business of a Chemist required a very small capital, and could be *much better* done by individuals on their own account than by a number of assistants acting under a board of directors. In such a case, therefore, the speculation was an unjust attempt at monopoly on the part of medical men, who had their own practice to depend upon, and who in addition desired to take away from Chemists their legitimate source of subsistence; the only pretext for the scheme being the alleged incompetence of the Chemists themselves. Unless the Chemists were firmly united and recognised as an educated body, they must expect to be continually annoyed and injured by such innovations.

Several Bills had been brought into Parliament since the establishment of the Pharmaceutical Society, which were calculated to inflict a general injury on Chemists; and the efforts of the Council, backed by the Members at large, had been attended with a favourable result. Besides the Medical Bills, several others, relating to the Stamp and Excise Regulations, had claimed especial attention, and the benefit derived by the Members from these exertions was much more than an equivalent for their contribution to the Society. Recent attempts had been made to subject Chemists to penalties under the Apothecaries' Act for dispensing prescriptions. The County Courts had been selected as the arena for this system of persecution, which, if it had not been met in a proper manner, might have been seriously annoying and expensive to many individuals. But by the prompt measures adopted in oppos-

ing the first case, the evil was, for a time at least, abated. For further particulars Mr. Bell referred to the last three numbers of the *Pharmaceutical Journal.* It was necessary to be continually on the look-out, as there was every reason to believe that other attempts would be made to carry out a similar object; and the Chemists must remain firm in their union for self-defence. There would be no security until an Act of Parliament had been obtained, and to this object the Council had for some time past been directing their attention. Some discouragement had arisen from the delay and confusion in regard to the settlement of the differences in the Medical Profession. It had been stated by the Secretary of State that the Medical question must be settled first, and no doubt this was desirable; but considering the present state of the profession as described in the last and preceding numbers of the *Pharmaceutical Journal* (which was by no means an overdrawn statement) it appeared almost a hopeless case if dependent on an issue so improbable. The Council had therefore endeavoured to convince the Lord Advocate, the Chairman of the Medical Bill Committee in the House, that the two questions might, under existing circumstances, be considered separately, and that the Pharmaceutical Bill ought to proceed on its own merits, in the event of continued obstacles existing in regard to the other measure. The general support and influence of the whole trade would be requisite in support of the Bill, the outlines of which Mr. Bell briefly explained.

But it was not only in a pecuniary sense that the union of the Chemists was desirable for purposes of protection—the character and credit of the body was concerned; and this consideration was one of great importance, especially in a business the success of which mainly depends on the confidence of the public. A few years before the Pharmaceutical Society was established, Mr. Bell had visited some of the Pharmaceutical Institutions on the Continent, and he found that the English Chemists were quite at a discount. They were considered to be a disunited and uneducated class of tradesmen, who had little or no pretensions to science, and who had done nothing for the advancement of the profession. This humiliating comparison between the English and Continental Chemists, had afforded an additional stimulus to embrace the first opportunity which occurred for removing this stigma. A great change had taken place within these last eight years. The Pharmaceutical Chemists of this country were no longer despised on the Continent as they had previously been; on the contrary, their proceedings in the improvement of education, and other matters relating to science, had been a source of emulation abroad. The Chemists in Antwerp had established a similar Society, held meetings, and published a Journal. In France the regulations of the School of Pharmacy had been remodelled and improved; and there was every reason to believe that the fear of being left behind by the British Pharmaceutists had occasioned a wholesome and creditable spirit of rivalry in other countries. Mr. Bell, and those who had laboured with him, fully entered into this feeling on behalf of his country; and having for several years been in correspondence with Chemists on the Continent, he could state with confidence that the exertions for the reformation in British Pharmacy were appreciated. These exertions had not been confined to the metropolis; the Chemists in Bristol, Bath, Birmingham, Norwich, and other places, had lent a helping

hand. Lectures had been delivered, meetings held, and papers published, all tending to the same end—the advancement of knowledge and the promotion of harmony among the Members of the body in carrying out this important object. In Liverpool, which is generally considered second only to London in importance and energy, the Chemists had not sustained their character as Liverpool men,—they had done little or nothing in aid of the undertaking. Mr. Bell felt assured that this apparent lethargy in Liverpool arose from accidental circumstances, and that when the subject was fairly introduced, and the facts of the case promulgated, the Chemists of that locality would come forward with zeal and determination, and extend the character which that city had acquired in commercial pursuits to a branch of commerce connected with science and allied to a profession; and that by a perseverance in these measures, strengthened by a bond of union among all parties concerned, the Pharmaceutical Chemists of this country would obtain and secure to themselves that position and character to which their avocation entitled them, if followed in a manner creditable to themselves and beneficial to the public.

Mr. Alpass considered the facts which had been stated very important, and the deductions from them conclusive; but while acknowledging the propriety and advantage of supporting the Society, he observed, that a question arose in the case of those who did not already belong to it, namely, How could they be admitted? In his own case, for instance—he had been regularly educated in the business, and had lived in several first-rate houses, but was not established on his own account until after the date of the Charter. Now he would certainly object to submit to be examined by gentlemen of his own standing (except in regard to the date at which he commenced business on his own account) who, by means of "catch questions," might pluck him, and thus do him a serious injury. At all events, he should be glad to know, before subjecting himself to this casualty, what kind of examination it would be, and whether due indulgence would be extended to parties who, like himself, had had much experience in the practical part of the business, although not deeply initiated in the modern scientific details. In botany, for example, a science which at the time he was an apprentice was not considered necessary for a Chemist, he could not pretend to much proficiency, and his business engagements would prevent his devoting much attention to the study.

Mr. Edwards observed, that having passed the minor and also the major examinations, and having been in communication with many others who had passed, he was enabled, from his own experience and theirs, to give an answer to the inquiry on the subject. He could distinctly state that the Examiners had no "catch questions," that they showed no disposition to puzzle or to pluck candidates. On the contrary, it was evidently their desire rather to facilitate than to throw difficulties in the way. The questions were of a practical nature, and were such as any Chemist, qualified to carry on the business, ought to be able to answer. He (Mr. Edwards) had enjoyed the privilege of attending as a practical pupil in Bloomsbury Square, and therefore had no difficulty in regard to the chemical part of the examination; and the advantages afforded by the botanical garden, and the lectures in the Regent's Park, were amply sufficient to enable a candidate to qualify himself in a short time in that department.

Mr. H. S. Evans, who had passed the examination, confirmed this statement.

Mr. Rowland thought that it was scarcely necessary to go to London for a botanical garden, as there was one at Liverpool, which had recently been purchased by the corporation.

Mr. Bell supported this suggestion, conceiving that it might be desirable to apply to the corporation, requesting that a portion of the garden might be appropriated to medicinal plants. This course had been adopted in London, in reference to the garden in the Regent's Park; which did not belong to the Pharmaceutical Society, but the privilege of admission had been granted to the class, and a liberal supply of medicinal plants had been brought into cultivation. Such an arrangement would be equally advantageous at Liverpool, and might be the commencement of a system of education, forming an inducement for association among the Chemists for mutual improvement.

Mr. Rowland advocated the immediate adoption of a resolution, forming a Committee to co-operate with the Pharmaceutical Society. A general feeling in favour of such a step appeared to prevail, and it was desirable to take advantage of the opportunity, especially as it might be a considerable time before the occurrence of so numerous a meeting of Chemists under such favourable circumstances. Mr. Rowland concluded by moving,

"That a Committee be appointed to carry out the objects of the Pharmaceutical Society, and to make arrangements for future meetings of the Chemists of Liverpool, for the advancement of knowledge in botany and other branches of pharmaceutical education; and that the Committee consist of Messrs. Edward Tinker, George Thompson, William Jones, William Baskerville, Edward Tiernau, William Rodgerson, B. C. Rowland, T. A. Titherington, John Prescott, H. S. Alpass, J. Balmer, Thomas Fell, William Procter, C. H. Shaw, George Bramwell, jun., T. Bickerton Evans, William Rawle, Edmund Jardine, John B. Edwards, H. Sugden Evans, and Edward Evans; with power to add to their number."

The motion was seconded by Mr. Rawle, and carried unanimously.

Mr. George Thompson said he was glad to see so numerous a meeting. He had acted as Secretary for Liverpool for two or three years after the establishment of the Pharmaceutical Society, but he had always found it difficult to obtain a good attendance, and had been rather discouraged at the want of unity among his brethren at Liverpool. Several years ago, he had acted on a Committee in a matter seriously affecting the interests of the Chemists in that locality, and nearly all the work was done by himself and two or three others, while some of his friends did not even contribute to the expenses, leaving a considerable balance to be defrayed by the Committee. He hoped the present indication of unanimity might be taken as evidence of an improvement, and should be glad to give as much assistance as his time would permit, in furtherance of the undertaking. He moved the following Resolution, which was seconded by Mr. Baskerville, and carried unanimously.

"That a sub-committee be appointed to make preliminary arrangements, consisting of Messrs. Rowland, Rawle, Jardine, Thompson, Evans and Alpass."

Mr. Rowland *moved*, and Mr. Rawle *seconded*, the next resolution, viz. :—"That Mr. Edwards be requested to act as Secretary."

The motion was carried unanimously.

Several inquiries were made respecting the terms on which new Members, or those who had discontinued their Membership, might obtain admission ; to which

Mr. Bell replied, that those who had been in business before Feb. 23, 1843, could be elected by the Council without examination, on payment of an Entrance-fee of two guineas ; those who had discontinued their Membership might be re-admitted on payment of arrears, or by passing the examination—a course open to all, without the payment of any Entrance-fee. It was the practice of the Council to afford every facility for admission which the terms of the Charter would permit, it being desirable to extend the Pharmaceutical Society, and thus increase its influence as much as possible. With regard to the examination, which was one of its most important features, care had been taken not to make this too stringent in the first instance, but in proportion as the proficiency of the Pupils increased by means of the practical schools and other opportunities of improvement, it was proper that the examination should keep pace with such proficiency. At the same time the Council desired to carry out the spirit as well as the letter of the Charter, in the cases of those who from their peculiar circumstances had a claim for indulgence. The Charter provided that Chemists who were in business before Feb. 23, 1843, might be admitted without examination ; and the principle on which this exception was made applied in some degree to those who, after many years' experience as Assistants, had commenced business on their own account a short time after that date. They had not enjoyed the educational advantages afforded by the new Society, nor had they entered upon their Pharmaceutical studies in the first instance with the expectation that they would be required to pass any examination. In modern science they were probably rather deficient, yet they possessed considerable practical experience, and might be said to have a vested interest in the business, which they had studied in the manner customary at the time of their apprenticeship. Consequently in such cases the Examiners considered it no more than justice to allow some indulgence, making the examination practical, and divesting it of those scientific details which to the Pupils in the laboratory of the Society might be quite familiar.

With respect to the Association which it was the purpose of the Meeting to organise, Mr. Bell suggested as a very important provision, that in the meetings and proceedings of the Members, no allusion whatever should be made to the closing of shops, the regulation of prices, or any subject of that nature, which might occasion disunity by the collision of interests, and the consequent feelings of jealousy or distrust naturally arising from such discussions. As long as they confined their proceedings to scientific subjects, or matters relating to the general welfare of the body at large, much advantage and satisfaction might be expected from the proposed association and the occasional meetings for mutual improvement; but if they once allowed any discussion on shop regulations, they would be in danger of falling to pieces. It was also desirable to forget all past differences or misunderstandings,

and rather to look forward—keeping the main object constantly in view, namely, the improvement of the social and professional standing of Pharmaceutical Chemists in this country, and the protection of their general interest.

Mr. Woolley (of Manchester) fully concurred in the propriety of excluding discussions of the nature objected to by Mr. Bell. The Members of the Pharmaceutical Society at Manchester had established periodical meetings for useful conversation and improvement, which for a considerable time excited much interest, and appeared to promote harmony and good-will. But, one unfortunate evening, a Member gave notice of a Motion respecting the closing of shops on Sunday. The next Meeting was rather a stormy one, and the introduction of this subject led, in a short time, to a discontinuance of the Meetings.

Votes of thanks having been passed to Mr. Bell and to the Chairman, the Meeting separated.

NOTICES OF BOOKS, &c.

Reports of the Royal College of Chemistry, *and Researches conducted in the Laboratories, in the Years* 1845, 46, 47. Pp. 270.

The subscribers to the Royal College of Chemistry have long been anxious to possess some further account of the proceedings of the Institution than that contained in the Annual Reports, and the volume before us has been issued by the Council in compliance with the wish expressed to that effect. It gives a brief sketch of the history of the College, with extracts from the reports of previous years, showing the difficulties which had been encountered and ultimately overcome, and concluding with a very satisfactory representation of the present position and prospects of the College. This is followed by a paper—the substance of a lecture delivered at one of the evening meetings of the College—on the Importance of cultivating Experimental Science in a National Point of View, by Professor Hofmann. The remainder of the volume is occupied by papers which have been published by Dr. Hofmann and his pupils, and all of which have been read, we believe, before the Chemical Society. The following are the titles of these papers :—

"RESEARCHES IN INORGANIC CHEMISTRY.

"On the Water of the Thermal Spring of Bath (King's Bath). By George Merck and Robert Galloway.—On the Mineral Waters of Cheltenham. By F. A. Abel and Thos. H. Rowney, Assistants in the College.—On the Water of the Artesian Well, Trafalgar Square. By F. A. Abel and T. H. Rowney.—On the Thames Water. By George Frederick Clark.—On the Ashes of the Orange Tree (*Citrus aurantium*). By T. H. Rowney and Henry How.—On the Bohemian Glass as found in the Combustion Tubes employed in Organic Analysis. By T. H. Rowney.— On an Ancient Peruvian Alloy. By Henry How.

"RESEARCHES IN ORGANIC CHEMISTRY.

"On Cochineal (*Coccus cacti*). By Warren de la Rue, F.C.S., &c.—On Cumarine. By Hermann Bleibtreu.—On the Composition of Caffeine and some of its Compounds. By Edward C. Nicholson, Esq.—On the Volatile

Organic Bases, I. II. and III. By Professor Hofmann.—On the Compounds of Phosphoric Acid with Aniline. By Edward C. Nicholson.—On Cumidine; a new Organic Base. By Edward C. Nicholson.—On some of the Products of Oxidation of Cumol by Nitric Acid. By F. A. Abel.—On the Products of the Decomposition of Cuminate of Ammonia by Heat. By Frederick Field.—On the Action of Nitric Acid on Cymol. By Henry Noad.—On Coal Tar. By Charles Blachford Mansfield, B.A."

The production of so many papers, involving much laborious research, is highly creditable to the school.

LECTURES ON ELECTRICITY; *comprising Galvanism, Magnetism, Electro-Magnetism, and Thermo-Electricity and Electro-Physiology.* By HENRY M. NOAD, Lecturer on Chemistry at St. George's Hospital, &c. Third Edition, greatly enlarged, illustrated by nearly 300 Woodcuts. 8vo, pp. 504. London: George Knight and Sons, Foster Lane.

REPORT OF FACTS, *Narrating Recoveries of the Deaf and Dumb.* By A. TURNBULL, M.D. 8vo, pp. 65.

DIGEST OF SECOND REPORTS ON SANITARY REFORMS. By W. SIMPSON, Esq., Surgeon. 8vo, pp. 23. Renshaw.

TO CORRESPONDENTS.

R. G. (Grantham).—(1). The quality of powdered rhubarb must be determined by an examination of its physical characters. Paper coloured by an infusion made from the powder ought not to be reddened by the application of boracic acid.—(2). Precipitated sulphur, when pure, is entirely volatilized on the application of heat.

J. T. (Newcastle-on-Tyne).—The purity of metallic silver may be determined in the following way:—Dissolve fifty-four grains of the specimen in nitric acid, and add pure hydrochloric acid as long as a precipitate is formed. The filtrate should leave no solid residue on evaporation. The precipitated chloride should be soluble in solution of ammonia; entirely precipitated and not dissolved by nitric acid, and after being washed, dried and fused, should weigh 71.75 grains.

Peterborough.—The action is probably similar to that which occurs on putting a match containing chlorate of potash into oil of vitriol. Chlorous acid is produced, which, in contact with a combustible body, ignites.

P. H. (Peterborough).—The following is the formula for

WHITE LINIMENT.

℞ Oil of turpentine, ℥ij.
Solution of ammonia, ℥ij.
Soap liniment, ℥iij.
Spirit of rosemary, ℥j.
Distilled vinegar, ℥viij. Mix.

Spes.—There is no authorized formula for compound tincture of orange peel.

M.P.S. (Leeds).—Noad's *Lectures on Electricity and Galvanism.*

Δ.—(1). None.—(2). Naphtha varnish is a varnish in which wood spirit is substituted for spirit of wine.—(3). Lindley's *Synopsis of the British Flora.*

A Country Member.—"Cinnabar" or "Cinnabar of Antimony," are terms formerly applied to vermilion.

Non-Chemicus.—(1). We think the formula a good one.—(2). Acidulated kali.

W. T. (Kingstown).—For the mode of preparing syrup of iodide of iron, see vol. i., page 520, and vol. vi., page 315 of this Journal.—(2). The nature of the products formed in citrine ointment has not been accurately determined.

Amator Scientiæ inquires the cost of a collection of specimens of Materia Medica. We cannot give an estimate that would be of any value, as the cost must depend on what is comprehended under the term "Materia Medica,"—on the size of the specimens—the way in which they are put up, &c.

A.P.S. (Leeds).—The instructions of the Pharmacopœia respecting Decoctum Cinchona are indefinite. We have already stated that when the kind of cinchona is not specified, we use the yellow bark, and have done so above ten years, in accordance with the generally received opinion of the profession. A correspondent (vol. viii., p. 297) calls in question this practice, and, according to the strict *letter* of the law, we cannot contradict him. No instructions are given for adding more water to compensate for evaporation.

A Registered Apprentice (Knightsbridge).—We suspect the sample is artificially coloured.

Gadus.—The report of experiments would have been interesting if authenticated with the name of the author, in the absence of which the paper is of no value. Anonymous evidence is the evidence of nobody. We not unfrequently have occasion to regret, as in this instance, the omission of the names of correspondents (confidentially or otherwise) in cases where the value of statements depends on the authority on which they are made.

A Constant Reader (Hull).—Aqua Rosæ should be made from the flowers; Aqua Cinnam. and Aqua Cassiæ from the bark; Aqua Pimentæ from the berry; Aqua Menth. Pip. and Viridis, are, we think, better when prepared with the oil. In all cases where oil is used it should be fresh. Extract of Taraxacum from the expressed juice is much better than that which is made by boiling the root. In the preparation of all extracts a low temperature is desirable.

An Old Member.—Syr. Ferri Iodid. See vol. i., pp. 47 and 416.

Mr. Hall (Truro).—Blaine's *Veterinary Art.*

C. P. (Hull).—Fownes's *Manual of Chemistry*, Royle's *Materia Medica*, Lindley's *School Botany, and Elements*, Mohr and Redwood's *Pharmacy.*

A. Z. and *Josephus* should write to the Secretary, Mr. Smith, 17, Bloomsbury Square, who would reply by post.

Z. M. (Middleton-on-Tees).—Yes.

A Well-wisher of the Ph. S.—We have added the specimen to the collection.

W. W. (Truro).—We think the best solvent for gutta percha, where economy is an object, is benzole. See vol. viii., p. 542. It is also soluble in chloroform and in ether.

M.P.S. (Henley-on-Thames).—There are no authorised formulæ for solutions of acetate and muriate of morphia. It is unsafe to prepare any prescription in which they are ordered indefinitely without inquiring of the prescriber what he means.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the EDITOR, 338, Oxford Street, before the 20th of the month (if Answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. IX.—No. II.—AUGUST 1st, 1849.

THE MEDICAL BILL.

As we anticipated, the Medical Bill continues in the latent state. The caloric which the anticipation of it had occasioned has subsided, and all parties appear to have settled down to the zero of indifference. It is reported that a Bill will be introduced and read the first time quite at the close of the session; but so completely has the measure been drowned in *embryo* by the cold water which has been thrown over its shadow, that even those who really expect to see it are proof against disappointment, and those who expect nothing are in the same happy condition.

It is impossible for any one who feels sincerely interested in the welfare and character of the profession, to review the events of the last eight or ten years in reference to medical reform, without feeling deep regret at the infatuation which has frustrated every effort to bring about a fair and wholesome arrangement. In the midst of these gloomy reflections, there is a mixture of the ludicrous in some of the proceedings, which gives to the whole affair the character of a melo-anti-serioso comedy. Striking off the ludicrous portions of the plot, that is to say, the factious and whimsical objections, there are only two sources from which any real difficulty is to be apprehended; namely, first, the attempt to reduce the profession to an equality of rank and qualification, which may be called Medical Chartism or Communism; and, secondly, the determination of the two Universities of Oxford and Cambridge to supersede the College of Physicians, which may be termed Medical Toryism. It is quite clear that neither Chartists nor Tories will ever bring about reform. The tendency of the former is to introduce anarchy and confusion; the latter will cling pertinaciously to the remains of a rotten old edifice, although it may be the only existing obstacle to the formation of a new and improved range of buildings. Our hopes of success in medical, as well as in political reform, rest upon the Conservative reformers, those who would preserve all that is good and valuable in the old institutions, remodelling them, and rejecting those portions which are decayed and useless, or inapplicable to the present time. When the reasonable and moderate men have gained sufficient strength to swamp the outsiders, we may hope to see some advance in the work of reformation.

THE PROGRESS OF PHARMACY.

We turn from the scene of perplexity presented by the profession at large, to take a brief review of the state of our own department—Pharmacy. Here we have a more encouraging prospect. The late convivial meeting on behalf of the School of Pharmacy, the reports of the branch associations in Bristol and Liverpool (published in another part of this number), the steady influx of candidates for examination, and the increasing indication of a disposition to join the Society by passing this ordeal, afford evidence of the encouraging fact, that a move has been made in the right direction. It has become an object of ambition, especially with the rising generation, to become members of an institution identified with that kind of character and respectability which education alone can confer. The nervous anxiety to escape the examination has given place to a desire to qualify for passing it. The number of registered Apprentices is steadily increasing; and those who enter their profession in this manner, do so with their eyes open, knowing that, in order to take the next step in advance, they must apply themselves to study. Already has this initiation produced its influence. The registered Apprentices are gradually becoming Associates, and the Associates rise to the position of Members. All must be examined, and the proficiency evinced by the candidates is improving with their numerical increase.

Nor does the benefit end here. The acquirement of knowledge has a natural tendency to expand the mind and produce a thirst for more. Some of those who have passed the major examination, who have gained the highest distinction the Society can confer upon its Members, are not satisfied. They see before them a wide field for mental industry, a prospect of an intellectual harvest; and having passed an examination in compliance with the rules of the Society, they continue their studies for their own satisfaction. The grand principle is now generally recognised, that the business of a Chemist and Druggist is something more than a mere trade; and that protection, respectability, and success, are directly connected with professional qualification.

Although we have no Lord Advocate espousing our cause in the House of Commons, although there is no Parliamentary Committee endeavouring to persuade us to improve our condition, yet our prospect is bright and cheering. Whether an Act of Parliament be obtained next session, or whether it be delayed for a few years, is a question which ought not to influence our proceedings, or to regulate our hopes. The Society is gaining strength every year, it is acquiring a character which will reflect increasing credit and respectability on all its Members; and when the paralyzing effect of the late medical squabbles has subsided, advocates will not be wanting in Houses of Parliament.

In the mean time we must be our own advocates—every Member

and Associate should put his shoulder to the wheel, and do what he can, whether much or little, to promote the objects for which the Pharmaceutical Society was founded, recollecting that Union is Strength, and Heaven helps those that help themselves.

THE SEWERS OF THE METROPOLIS.

The Sewers Commission is literally in a state of disorganisation and paralysis. Several officers of the establishment, of many years' standing, have resigned their appointments, and the Board is divided against itself in reference to the various theoretical or practical schemes which have been proposed for securing a complete and effectual drainage for the Metropolis. Pending these discussions, the sewers are generally in a constipated and offensive state. The fall is in some places in the wrong direction, forming cesspools of many yards in length, and it is obvious that the whole system of drainage requires immediate reformation. The practice of flushing the sewers, recently adopted by the commissioners, has been productive of much annoyance. The contents being accumulated in the sewers and let loose at intervals, with a view of stirring up and carrying away the deposit, this offensive compound has, in some cases, percolated through the earth and poisoned adjacent wells, and the effluvium from the gulley-holes has given rise to serious complaints on the part of the inhabitants.

The general discontinuance of cesspools has tended to increase the evil, as the solid contents of the privies, instead of being removed by the nightmen, are discharged down the sewers into the Thames or the Serpentine.

We may hope that a crisis is approaching. The combined energies of the Government, the Board of Health, and the Commissioners of Sewers, ought to contrive some effectual means of diverting these poisonous matters from the water which the public drink, and in which they bathe, to the agricultural districts, where the compound would be invaluable as manure.

SURVEY OF THE SEWERS OF THE METROPOLIS.

A report on the subterranean survey of the metropolitan sewers has just been presented to the commissioners by Messrs. Austin and Smith, consulting engineer and assistant-surveyor. The following statements may be taken as a fair sample of the present state of the Westminster sewers in the most fashionable localities:—

Belgrave Square.—These sewers are in a very unsatisfactory state, having above a foot of solid deposit.

Lowndes Place.—This sewer has from one to two feet of deposit (the smell is most horrible), and the house drains are nearly stopped.

Knightsbridge Green and Brompton Road.—At the junction of these sewers the brickwork is in a dangerous state, and appears never to have been completed. From this manhole to the next, in the direction of Sloane

Street, the deposit is so great and the stench so strong, that one of the men came out in a fainting state.

Grosvenor Place.—This sewer has from nine to fourteen inches of foul deposit.

Downing Street.—The sewer is nearly choked with filth.

Oxford Street.—The sewer on the north-side, from Portman Street westward, is in so ruinous a state as to be in danger of falling in; the arch is broken and depressed, the bottom full of steps and all kinds of inequalities, so that the sewer must be choked with deposit before it can have any discharge.

Whitehall Place.—This sewer is in a wretched state, with two or three feet depth of filthy deposit.

St. George's Square.—These sewers have from one to two feet of putrid matter.

Pimlico Road.—This sewer has deposit all along it, and near Arabella Row (in the immediate neighbourhood of Buckingham Palace) it is twenty inches deep.

Upper and Lower Berkeley Street and Portman Square North.—These sewers are in a ruinous condition, the side walls and crown having fallen in in various places. The invert is forced up, so that the breadth is only nine inches where it was formerly three feet; and for a distance of 1035 feet, the walls are abutting one against the other, and the arch without support for distances of twenty to thirty feet in length, and sometimes held up by a mere brick. Should this give way, the road will instantly follow. There is a deposit of nine inches to two feet of rotten bricks, and so choked up that part of it could not be levelled.

Bryanston Square.—The arch of the sewer in a very dangerous condition.

Cavendish Square.—The sewer very much decayed; the invert washed up in many places.

Manchester Square.—A large part of this sewer is in a very dangerous condition.

Molyneux Street.—The lower part of this sewer is in a most horrible condition, from decay and filth; the arch and side walls are in danger of falling; the deposit is two feet in depth.

Wimpole Street.—For about 150 feet of this sewer the bottom is washed away, and the side walls undermined.

Upper Brooke Street.—Sewer in a crumbling state, and astonishment is expressed that it stands at all.

Curzon Street.—The springing walls are crushed in on both sides, at various places, for the distance of 150 feet; the rubbish lying about the sewer obstructing the discharge, and the deposit accumulating so fast that the sewer will shortly be choked up altogether.

Parliament Street.—The side walls for 200 feet, joining Bridge Street, are in a ruinous and crumbling condition. The north end is filled with deposit to the soffit, although the sewer is 5 feet 10 inches by 3 feet 2 inches. The smell is horrible.

Whitehall and Spring Gardens.—From three feet to four feet of detritus deposit.

Hanover and Berkeley Squares.—A considerable deposit in these sewers, emitting most offensive effluvia.

Fitzroy Square.—The invert of this sewer nearly all washed away.

The report states generally that the sewerage of the city of Westminster is in a rotten state, and contains a large amount of foul deposit; that in Belgrave and Eaton Squares the sewers abound with noxious matter, stopping up the house drains and smelling horribly; as also in Grosvenor, Hanover, and Berkeley Squares; and that even throughout the new Paddington district, the neighbourhood of Hyde Park Gardens, and the costly

squares and streets adjacent, the sewers abound with the foulest deposit, from which the most disgusting effluvium arises ; and that amidst the whole of the Westminster district of sewers, the only little spot at all satisfactory is in the immediate neighbourhood of the Seven Dials.

We have just seen a copy of a Bill now before Parliament, entitled " A Bill to Amend the Metropolitan Sewers Act," by which it is proposed to enlarge the powers already possessed by the Commissioners of Sewers, giving them absolute control over the parish authorities and the public at large, in reference to the removal of nuisances and sundry other matters. In addition to the powers of compulsion in such cases, the Commissioners are by this Bill authorised without notice to remove any nuisance which may be reported to them as being injurious to the health of the neighbourhood. This is a power which should be exercised with much discretion. If, for instance, an epidemic should arise, and a foul drain be the reputed cause, it would be imprudent to select that particular time for stirring up a sink of pollution. The more prudent course would be to temporise during the prevalence of immediate danger, by superficial cleansing and disinfection, or removing the inhabitants from the infected spot if necessary ; taking the first opportunity after the epidemic has subsided, to effect a radical removal of the supposed cause of the evil. The Bill contains a wholesome provision in regard to the Water Companies, who are to be compelled on demand to furnish a supply of water for sanitary purposes. There is, however, no provision for the introduction of a comprehensive and effectual system of drainage, nor do we observe any alteration in the constitution of the Board of Commissioners. Such Board ought to be annually elected, and subject to some control and responsibility. When a man is installed for life in a snug berth, with a large salary, he soon becomes careless and independent. The only security for assiduity and good behaviour is an annual election, with a rod in pickle in case of delinquency.

THE CHOLERA.

The rapid increase of this intractable malady in the metropolis has realised the predictions of those who have watched its progress in other localities. Notwithstanding the precautions which have been taken, and the pamphlets which have been written on the subject, the disorder has been in many instances rapidly fatal, the interval between apparent health and the mortal termination having been eight or ten hours, in some cases even less. The deaths in the metropolis from this cause have, during the last six weeks, been almost doubled in number during each succeeding week, and the average mortality, as compared to the number of attacks, varies, so far as we have been able to ascer-

tain, from twenty-five to sixty per cent. The prevailing opinion that foul sewers and noxious effluvia are connected with the spreading of the cholera, is rather strengthened than otherwise by the report quoted in our preceding article on the state of the metropolitan sewers, which being stirred up by the disgusting process of flushing, emit their fœtid odours in almost every street. It is also observable that cases seldom occur singly, but more often several take place in the same house or immediate locality, from which it may be inferred that the cause, whatever it be, is in some degree local. In the Marylebone Infirmary, where twenty-two cases occurred in about ten days, a majority of the fatal cases originated in a ward contiguous to which is a burial-ground, separated only by a wall which is frequently damp; a circumstance by no means favourable to health, especially when the proximity of bodies in a decomposing state is taken into consideration. The convict-ships, prisons, and other crowded dwellings, where cholera has made its appearance, may also be mentioned in confirmation of this view. Other causes have also been problematically assigned, among which is electricity; and we have seen it recommended by some speculative authorities, that where a patient is seized with the cholera, a door should be taken off its hinges and placed on four strong bottles, properly varnished, as insulators. Upon this machine the bed of the patient is to be placed, and charged with positive electricity! This theory, like all others on the subject, is unsupported by evidence, and we may hope that it never will be substantiated, as the remedy is quite inaccessible in a majority of cases, and in others the bottles would scarcely be varnished before the death of the patient.

The use of a hot-air bath, to promote reaction and warmth of the surface, appears to be less popular than it was formerly. We have been informed that a better mode of producing this effect is to wrap the patient in a wet sheet covered with several blankets, on the hydropathic principle, administering ice internally at short intervals. Several cases treated in this manner recovered, while others, treated more on the principle recommended by the Board of Health, died.

Under all these circumstances we can only view the cholera as a visitation of Providence, but little, and often not at all, under human control. There is a limit beyond which medical science is unavailing.

The following paragraph has been published in some of the newspapers :—

"Experiments have been tried at St. Petersburgh, by order of the Emperor, to ascertain whether cholera was infectious. Four murderers sentenced to death were, without being told who had been its previous occupants, put on a bed recently occupied by four cholera patients who had died; and not one of them took the disease. It was then announced to the murderers that they were about being placed on beds in which four

persons had died of malignant cholera, and that if they escaped the disease their lives would be spared. But instead of cholera beds, the murderers were put into beds which had not been occupied by diseased persons at all, yet such was the effect of their fears that all four died within three days."

This logic is defective. What proof is there that the men had not contracted the disorder in the first bed? If fear alone be capable of producing cholera, this might probably afford an explanation respecting the 6000 or 8000 cases alluded to in the following article :—

QUACKERY.

Although the fraternity of quacks are usually associated in the public mind with the notion of ignorance and imposition, the term *quackery* does not of necessity imply the absence of qualification. A qualified practitioner, who is guilty of unprofessional conduct—who seeks to obtain notoriety by arrogating to himself pretensions not founded on fact, or by resorting to a disreputable mode of advertisement—has no right to complain if his name be mentioned in connexion with that class of persons with whom he has thus identified himself.

In our last number, under the head "Quackery," we quoted the hand-bill of a medical practitioner in the North of England, which we had been informed was thrust under the doors in his neighbourhood. This liberty on our part has given great offence to the doctor, who threatens to proceed against us "for liable, and defamation of character, and scandle," on the grounds,

First, that his name has been on the Navy List as a qualified practitioner ever since the year 1824.

Secondly, That "a respectable man delivered the handbills, and will swear upon oath that not one of them was thrust under the doors."

Thirdly, That the Druggist, whose method of treating cholera the doctor has adopted, "after a series of years of deep study, arrived at the conclusion that the medicine would be good, tried it, and has sold as many as 500 doses of it in a day; and very few deaths took place among those that were so fortunate as to receive it."

Fourthly, That the remedy and mode of treatment are published by the discoverer in a pamphlet.*

Lastly, That since January last, from 6000 to 8000 doses have been administered by the discoverer, under the doctor's personal observation.

We quoted the handbill last month without note or comment. In publishing the above statement we need only ask, Were the 6000 or 8000 persons to whom the said doses are stated to have been sold suffering from cholera or from fear? If from cholera, why were the cases not included in the official return? If merely from fear, what other term could be properly applied to this kind of practice than the one under which we placed it?

* Published by G. Green, 99, Side, Newcastle-on-Tyne. Price 3*d.*

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

ELECTION OF PRESIDENT AND VICE-PRESIDENT.

At a meeting of the Council, held on Wednesday, the 6th of June, the following gentlemen were elected President and Vice-President of the Pharmaceutical Society for the ensuing year :—

Mr. Peter Squire, 177, Oxford Street, *President*;
Mr. William Ince, 31, Southampton Street, Covent Garden, *Vice-President*.

THE PHARMACEUTICAL SCHOOL DINNER.

This dinner, which was announced on the cover of our last number, took place at the London Tavern, on Tuesday, the 17th of July,

Dr. Copland, F.R.S., in the Chair.

It originated (as stated in the advertisement) with the students, who had availed themselves of the means of instruction afforded by the Pharmaceutical Society, having for its object the encouragement of Pharmaceutical education, by the diffusion of a more general interest in the subject. The Council and many Members of the Society united warmly in promoting the object. The dinner appeared to give general satisfaction, and was numerously attended, the number present being 134.

After the usual loyal toasts had been drank, the Chairman observed, in proposing "The Pharmaceutical Society," that, although he had felt some diffidence in accepting the office of Chairman on the occasion, he nevertheless had much pleasure and satisfaction in doing so, inasmuch as he considered that the Society had conferred incalculable benefit not only on the body of Pharmaceutical Chemists, but on the public at large, and especially on the profession of which he was a Member.

During his career as a Physician, he had noticed the important change which had taken place in the manner in which Pharmacy was exercised in this country; and on comparing the state of that department of the profession twenty years ago, with its condition at the present time, the result was a subject of much congratulation. Formerly, the number of Pharmaceutical Chemists who acquired the requisite scientific knowledge of their business was comparatively small; and although some of these might have been equal if not superior in attainments to continental Chemists, the

majority were far otherwise. So disinterested had the minority proved themselves to be, that they had at great expense and labour, founded an institution comprising a School of Pharmacy, which was designed to destroy the kind of monopoly which had previously existed, and to spread the benefit of education generally throughout the trade. He called it a trade, but it was more—it might with equal propriety be termed a profession, requiring as it did, a knowledge of two of the most interesting sciences, Chemistry and Botany, the former of which might truly be said to be, with the exception of mathematics, the most exact of all sciences. The Society had already been instrumental in raising the qualification of Pharmaceutical Chemists, diffusing information among the Members, and drawing attention generally to chemical science. When the objects of the Society were fully realized, as he trusted they would be ere long, one great source of anxiety would be removed from that branch of the profession to which he belonged, namely, uncertainty in regard to the preparation of medicines. When asked by patients, "Where shall the prescription be taken to be prepared?" the answer would be, "To any Member of the Pharmaceutical Society." He congratulated the Members on the acquirement of a Royal Charter of Incorporation, and trusted that by a persevering application of the influence they possessed with Members of Parliament, an Act would be obtained, obliging all persons to pass an examination before commencing business as Pharmaceutical Chemists, and thus affording to the public a guarantee of their qualification.

The toast was drank with great enthusiasm; and

Mr. SQUIRE, as President of the Society, returned thanks, observing, that although perhaps he had not taken so prominent a part in the proceedings of the Society as some other Members, he had always been one of its most zealous supporters. He had been a Member of the Council from the commencement, and had taken much interest in the objects for which the Society was founded. Among these objects, he mentioned the protection of the interests of the Members and the Benevolent Fund, subjects which had not been alluded to by the Chairman.

The CHAIRMAN stated that he had now arrived at the toast which was in fact the special business of the evening, namely, "The School of the Pharmaceutical Society." He alluded in eloquent and appropriate terms to the great advantage of education, especially in a profession of this kind, which was founded upon science, and had for its object one of the most noble purposes with which the mind could be engaged—the relief of human suffering. In this school professors of the highest eminence were appointed to deliver lectures on Chemistry, Materia Medica, Pharmacy, and Botany, subjects which it was necessary for the Pharmaceutical

Chemist to understand. There was also a Laboratory for practical instruction and research, an extensive Library, and a valuable and interesting Museum. This School had already met with an amount of success which had been a source of surprise and satisfaction to the Medical Profession, considering that it was hitherto entirely a voluntary institution. He trusted that the rising generation would take full advantage of the privileges thus afforded, which would not only promote their success in business, but raise them in the scale of society.

Mr. Rogers, Ph.D. (of Honiton), returned thanks on behalf of himself and his late fellow-students in the School of Pharmacy, where he had received the first insight into the principles—he might say the elements, of the science of Chemistry. He had previously called himself a Chemist, but had not been long in the laboratory of the Society before he discovered how unworthy he was of the name. He had been accustomed, as an apprentice, to mix various ingredients together, of the nature and composition of which he was almost as ignorant as the pestle with which he stirred them in the mortar; and in this respect he feared he was too much like a large number of those who called themselves Chemists and Druggists. He had to thank the School of the Pharmaceutical Society for unveiling the mysteries of science to his mind, and teaching him the principles upon which alone his business could be safely and satisfactorily conducted. He felt that he owed a debt of gratitude to all the Members and Associates who had assisted in the support of the Society, and more especially to the Council, on whom had devolved the superintendence of the school. He hoped, for the benefit of his brethren, that the school would long flourish and extend its influence; and, in conclusion, requested permission of the Chairman to propose, as the next toast, "The Council of the Pharmaceutical Society, and Thanks to them for their attention to the Education of Chemists and Druggists."

Mr. Thomas Herring, in returning thanks on behalf of the Council, said that he had travelled from Dublin on purpose to attend that Meeting. It was impossible to resist the opportunity of meeting his fellow-members on so gratifying and convivial an occasion. He was glad to find that so much interest was taken in education, without which it was impossible to conduct business properly. Wholesale Druggists were liable as well as retail to make mistakes, and education was the most likely means of preventing such accidents. It also enabled the Chemist to detect impositions and inferior drugs, and he was convinced that in this business especially, honesty was the best policy. In conclusion, he proposed the health of "The Medical Profession."

Dr. Pereira returned thanks.

The next toast was "The Board of Examiners of the Pharmaceutical Society," on which the Chairman took occasion to point out the value of this part of the arrangements connected with the School of Pharmacy.

Mr. SQUIRE, as Chairman of the Board of Examiners, returned thanks, and expressed the great satisfaction which he had felt during the performance of his duties on that Board, of which he had been a member from the commencement, at observing the proficiency of many of the students, especially those who passed the major examination, an ordeal which he considered, in the departments which it comprised, equally strict with that of the University of London for the degree of Bachelor of Medicine.

The Chairman having proposed the health of the "Professors of the School of Pharmacy,"

Dr. PEREIRA acknowledged the toast on behalf of himself and his colleagues. It was, he said, a painful reflection that, although this was the first meeting of the kind since the establishment of the School, yet two of the Professors originally appointed by the Society had already been removed by death—one (Mr. Fownes) in the prime of life; the other (Dr. A. T. Thomson) at a more advanced period of life, during at least forty years of which he had been justly considered the father of English Pharmacy and Materia Medica. Passing, however, to more cheerful subjects, he reverted with satisfaction to the progress and condition of the School of Pharmacy, and the proficiency which had been attained by many of the students. The present, he observed, was the seventh year of the existence of the school, and during this period a large number of well-educated Pharmaceutists had been distributed over different parts of the country. On the introduction of an improved system of education among any class of men, especially those engaged in active business pursuits, it was generally found necessary to effect a gradual change. It was not to be expected, therefore, that Chemists and Druggists, for the scientific education of whom there had been no provision in this country previously to the establishment of the Pharmaceutical Society, would at once fully appreciate the advantages which such education was calculated to confer upon them. They were unable to estimate the time required for gaining a competent knowledge of the branches of science which related to their art, and they were not prepared to make the necessary sacrifice for that purpose. In the case of the Apothecaries, the system of education adopted had been gradually introduced. In the first instance only six months' attendance at lectures was required; this was subsequently extended to nine months, then to eighteen months, and lastly to three years. He thought the Pharmaceutical Society had acted wisely in pursuing a similar

course, by increasing from time to time the severity of their examinations. Even now, after a progressive advancement during seven years, it must be admitted that the course of instruction which the students generally went through was not so complete and extensive as it would ultimately be found desirable that it should be. It was true that many of the pupils attained to a high degree of proficiency ; but it must be remembered that under the present voluntary system, those who attended the school were generally the best men from among the whole body—those who studied Pharmacy from pure love of the subject. He believed, therefore, that the students of the present day, under the voluntary system, were capable of qualifying themselves in a shorter time than would be necessary for that purpose when all those who practised Pharmacy would be required to pass an examination. That such a period would arrive he could not entertain the slightest doubt. It was merely a question as to when the legislature would make the requisite enactment to prevent incompetent persons from engaging in the practice of Pharmacy. He believed he expressed the sentiment which generally prevailed in the part of the profession to which he belonged, when he stated that such an enactment was required in order to ensure the safe and proper administration of medicine. The Pharmaceutical Society had already done much, perhaps all that could be expected from a voluntary institution; and if they continued to promote the education of the body which they represented, as they had hitherto done, they would take the most effectual means of securing that aid from the legislature which has been the object of their desire ever since the establishment of the Society. Every succeeding year placed the Society in a better position. It had already gained the confidence of the public and of the medical profession ; a large number of educated men had been added to the Members of the Society; and ample notice had been given to those who are now apprenticed to the trade, that something more than a mere apprenticeship is necessary to make them qualified Pharmaceutists and Members of the Pharmaceutical Society. He trusted that these young men would avail themselves of the opportunities which the Society offered them of laying up a store of knowledge. The terms on which this knowledge was offered was so much below its cost to the Society, that it afforded evidence of great liberality on the part of those who, in their desire to promote education, had been determined that no obstacle of a pecuniary nature should stand in the way. It could scarcely be supposed that the fees should continue at the present low scale ; but the Council had, in his opinion, acted wisely in evincing the utmost liberality towards the Students on the establishment of such an institution founded on voluntary principles.

The time had come when it was necessary for those who were entering the business of a Pharmaceutical Chemist to include the acquirement of scientific knowledge by means such as those provided by the Society, among the necessary arrangements for completing their education. The knowledge thus acquired would be to them a stock in trade of which no bankruptcy could deprive them.

Mr. Redwood said he had been permitted by the Chairman to propose a toast, the subject of which very naturally suggested itself after that which had preceded it. It was, "The Laboratory Assistants of the School of Pharmacy." There were several gentlemen present who either had filled, or were still filling, the office alluded to; but he would particularly associate one of them with the toast, as being the senior ex-assistant, and one who had performed the duties of the office in so efficient and unexceptionable a manner, that his conduct might be set forth as a pattern to those who succeed him. He should ever feel grateful to Mr. Allchin, the gentleman to whom he alluded, for the valuable services he had rendered while acting as assistant in the laboratory. The office of Assistant in a School of Practical Chemistry was one of considerable importance, involving duties the efficient performance of which required a combination of qualities which are not of common occurrence It was not every man, possessing a competent knowledge of the subject to be taught, who was capable of aptly communicating the knowledge to others. Mr. Allchin, however, had given unqualified satisfaction to the Professors, to the Pupils, and to all connected with the school, and those who had succeeded him had been fortunate in following the good example which he had set. Among these he might mention Mr. Edwards, who had subsequently established himself at Liverpool, and Mr. Braithwaite and Mr. Down, the present Assistants. It was a source of much gratification to those connected with the management of the school, to find young men who have been pupils in the school becoming in their turn efficient ministers of instruction to others, and all those whom he had mentioned were of this class. It was also gratifying to be able to refer to instances such as those he had named, and others that he might name, which afforded evidence that the acquirement of scientific knowledge did not in any way incapacitate the possessors for the active pursuits of business, but, on the contrary, gave them great advantages over such as were ignorant of the principles involved in the practice of their art.

Mr. Allchin, in returning thanks, said the good conduct of the pupils, and the interest they had always manifested in their studies, had rendered the performance of his duties as Assistant in the laboratory a source of pleasure to him, and he had the great

gratification of being enabled to include not a few of the students among his best friends.

The health of "The Editor of the *Pharmaceutical Journal*," having been drank,

Mr. JACOB BELL acknowledged the toast, observing, that those contributors who assisted in promulgating knowledge by furnishing valuable papers and lectures for publication in the Journal, were entitled to share the compliment which had been paid to him as the Editor. He took the opportunity of drawing a comparison between the great advantages enjoyed by the young men of the present day, and the defective state of Pharmaceutical education at the time that he was an apprentice. In taking a review of the progress and present condition of the School of Pharmacy, there was but one circumstance to be regretted, namely, that the number of students who attended the lectures was not so great as the number present at the dinner on that occasion. He hoped that the rising generation would, by assiduity in their studies, aided by the School of Pharmacy, place themselves in a position far above their predecessors. All classes of society being in a progressive state, the Chemists ought not to be an exception to the general rule.

The CHAIRMAN proposed "The Visitors" as the next toast, observing that there were present members of the Medical, Clerical, and Legal professions.

The Rev. Mr. NORVAL returned thanks, and concluded a very eloquent address by proposing the "Health of the Chairman," which was warmly responded to and appropriately acknowledged.

The next toast was "The Stewards."

Mr. JOSEPH INCE, the Secretary to the Stewards, returned thanks, and expressed the pleasure it had afforded to himself and the rest of the stewards to meet so large a company of zealous supporters of the cause of Education. He hoped the arrangements had given general satisfaction, and that the younger members of the trade, with whom the dinner originated, would be exonerated from any charge of presumption for having suggested this means of furthering an object in which they all felt deeply interested.

The CHAIRMAN observed, that as the proceedings of the evening had passed off so agreeably, and he believed profitably to those present, he could not allow them to separate without proposing one more toast, which would involve them in a repetition of the dinner next year. He proposed "The Stewards Elect;" and he was authorised to announce that his friend Mr. Thomas Morson, jun., who, as treasurer, had taken so active a part on the present occasion, consented to be Secretary to the stewards for next year.

Mr. T. MORSON, jun., in returning thanks, expressed his readi-

ness to do all in his power to promote the cause of education, and to encourage a friendly feeling among the members of the trade, by the continuance, periodically, of meetings such as the present. He had cheerfully undertaken the duty of Treasurer on this occasion, and was equally willing to act as Secretary to the stewards for next year's dinner, being convinced that good would result from it. He begged permission to propose the last toast of the evening, "The Ladies," which was warmly responded to.

The company immediately afterwards broke up.

TRANSACTIONS OF THE BRISTOL CHEMISTS' ASSOCIATION.

The Annual Meeting of the Bristol Chemists' Association, was held on Friday evening, June 8th, 1849.

Mr. Giles, Vice-President, was called to the Chair, the President being absent from indisposition. The Chairman said he was sorry a larger number of the trade did not give the Society the support of their presence, although he was glad to find that those who did attend were perfectly satisfied, and that there were more in the room that evening than on former occasions. He then called on Mr. Schacht to read

THE SECOND ANNUAL REPORT.

The Council of the Bristol Chemists' Association, in presenting to its Members its Second Annual Report, feel great satisfaction in being able to direct attention to the advance the Society has made during the past year.

They would first advert to the selection of more eligible premises for their lectures and evening meetings; the room in which we are now assembled is considered in every respect convenient for these purposes, and has been engaged upon terms which must be considered satisfactory.

The Library has received the addition of the last year's series of the following scientific publications:—The *Lancet*, the *Chemical Gazette*, and the *two* volumes published by the Cavendish Society, viz., *Chemical Reports and Memoirs*, and *Gmelin's Chemistry*. These works have been presented by the Bristol Chemists' Reading Association, which has passed a resolution to deposit them in like manner at the end of each year's circulation. Through the industry of our Hon. Secretary, Members may now provide themselves with Catalogues of all the books in the Library, most conveniently arranged for reference. It is hoped the junior Members more particularly will avail themselves of these means of acquiring information.

The evening lectures of the past year, though neither so numerous nor so well attended as could be desired, have been of high interest and utility. The gentlemen to whose kindness the Society is thus

indebted, are entitled to its warmest thanks. The list includes the names of Drs. Fripp and Staples, and Messrs. Griffin, Owen, Giles, and Schacht.

Your Council, keeping steadily in view the first great object for which the Association was organized, viz. the improvement of the professional education of its Members, have directed their best energies to effect an arrangement with the authorities of the Bristol Medical School, by which opportunities to promote this great desideratum would be obtained, and placed within the reach of all. They are happy in being able to state, that their efforts in this direction have been attended with most satisfactory results; and they are now enabled to grant admission to the lectures on the three subjects most essential to their profession, on terms reduced to those of the London School of Pharmacy, viz.

CHEMISTRY, by W. Herapath, Esq.	£2	2	0
MATERIA MEDICA, H. J. Staples, M.D.....	1	11	6
BOTANY, G. H. K. Thwaites, Esq....	1	11	6

It should be observed, that these are the lectures delivered by the Professors at the Medical School, and are extended and detailed to the fullest degree. Your Council trust nothing need be urged as regards the extreme importance of this arrangement, by which Bristol, in a pharmaceutical sense, has been placed in a position not inferior to the metropolis; its *abstract* advantages will be readily admitted, but it is sincerely hoped and urged that these, great as they are, may be *fully applied*.

In the arts, ignorance is identical with incapacity, and incapacity must result in failure. They who never have learned *must* learn, or remain incapable; the student moreover well knows that it is easier (except with constant exercise) to forget than to acquire, and further, that science, more than anything to which it may be compared, is in a constant state of progress.

Let all remember that the *purpose* of the faculties consists in their employment; and let no legitimate means be neglected which conduces by such exercise to elevate the mind, and increase the general store of knowledge.

It was *moved by* Mr. WARREN, *seconded by* Mr. GRANT, and carried *unanimously*,

"That the Report, with the Treasurer's balance-sheet, be adopted."

The three retiring Members of the Council were re-elected, and Messrs. Warren and Taylor were elected to increase the number to twelve, including the Secretary. Mr. Barge was also re-appointed Hon. Secretary. Votes of Thanks were passed to the President, Vice-President, and Council; to the Secretary; and to the Sub-Committee, who had so admirably brought about the arrangement for the Bristol School of Pharmacy.

THE LIVERPOOL CHEMISTS' ASSOCIATION.

In our last number we gave an account in general terms of the proceedings which had been taken at Liverpool for the establishment of a Pharmaceutical Association. We now subjoin the official report of the same, which arrived too late for publication last month. It is also gratifying to be able to add a Report of the first scientific Meeting of the Association. Mr. Edwards, the Secretary, informs us that the progress of the institution is very satisfactory; about 140 Members and Associates are enrolled, and a considerable sum has been received in donations for defraying the preliminary expenses of forming the society.

In addition to the proposed Lectures enumerated in our last number, Dr. Nevins has consented to deliver two or three lectures on the Specific Gravities of Bodies, and on the Application of the Barometer and Thermometer to Chemistry and Pharmacy. Dr. Dickinson will also give three lectures on the Classification of Plants, at the institution, at seven o'clock in the morning, preliminary to the lectures at the gardens.

At a General Meeting of the Chemists and Druggists of Liverpool, held in the Clarendon Rooms, on Friday, June 22, 1849; Mr. T. B. Evans in the Chair;

The Chairman briefly stated the objects of the meeting, viz., to unite the Chemists of Liverpool into a Society for mutual improvement in Chemistry and Pharmacy, and thereby to establish a more cordial feeling among members of the trade. He adverted to the success attending similar efforts in London, Birmingham, Bristol, Bath, Colchester, and Norwich, and hoped that at least as much energy, talent, and unanimity existed in the body at Liverpool; and, considering the advanced position and superior acquirements of the present race of Chemists, with the prospect of still further accomplishment on the part of their successors, he urged the importance of Principals, both supporting this movement themselves, and giving every facility to their Assistants in availing themselves of such advantages.

It was Resolved:—

On the motion of Mr. G. Thompson, *seconded by* Mr. J. H. Johnson,

"That a Society, to be called 'The Liverpool Chemists' Association,' be now formed, of the Chemists and Druggists of Liverpool and its vicinity (including both Members and non-Members of the Pharmaceutical Society), having for its objects the better education, mutual improvement, and general advancement of the interests of that body, in co-operation with the Pharmaceutical Society."

On the motion of Mr. Abraham, *seconded by* Mr. Sumner,

"That the Association shall consist of 'Members' (connected with the Drug Trade), who shall annually subscribe the sum of 10*s.*, and of Associates, subscribing 5*s.*: the subscriptions payable in advance."

On the motion of Mr. Jardine, *seconded by* Mr. Strawson,

"That the affairs of the Society be conducted by a Council, to be elected annually by the '*Members*,' and consisting of President, Vice-President, and Treasurer, and seven Members, three to be a quorum; and three to retire annually, but to be eligible if re-elected."

On the motion of Mr. ALPASS, *seconded by* Mr. COUPLAND,

"That the following Members be appointed Council for the year ensuing, and empowered to elect from among themselves a President, and a Vice-President, who shall also be Treasurer—Messrs. Clay, Edward Evans, Thompson, Johnson, Tiernan, Rawle, Wagstaff, Rowland, and Shaw."

On the motion of Mr. ROWLAND, *seconded by* Mr. EDWARD EVANS,

"That the Society shall meet monthly, when papers, furnished by the various Members, on Pharmaceutical, Chemical, and other allied subjects, shall be read and discussed; and that Extraordinary Meetings shall be appointed for the delivery of Lectures on similar subjects, the time and place of meeting to be hereafter arranged by the Council."

On the motion of Mr. PRIESTLEY, *seconded by* Mr. WAGSTAFF,

"That the best thanks of the Society are especially due, and hereby gratefully rendered, to the following gentlemen, who have kindly offered their gratuitous assistance in carrying out the views of the Members, by the delivery of Lectures on various subjects connected with Pharmaceutical Education:—Dr. Dickinson, on Medical Botany (at the Botanic Gardens); Dr. Inman, on Materia Medica; Dr. Brett, on Toxicology, and also an Introductory Lecture; Dr. Muspratt, on Organic Chemistry; Mr. G. Hamilton, M.A., on Inorganic Chemistry; Mr. D. Waldie, F.C.S., on Pharmacy; Mr. J. B. Edwards, F.C.S., on the Imponderable Agents."

On the motion of Mr. RAWLE, *seconded by* Mr. EDWARD EVANS,

"That Mr. Jno. B. EDWARDS be requested to act as Secretary to the Society, and that he be an *ex officio* Member of the Council.

Thanks being returned to the Chairman, Members were enrolled, and a Donation List liberally commenced towards defraying the early expense of the Society.

At a subsequent Meeting of the Council, Mr. ROBERT CLAY was elected President; and Mr. EDWARD EVANS, Vice-President and Treasurer, for the present year.

PHARMACEUTICAL MEETING, LIVERPOOL.

Royal Institution, Colquitt Street, Friday, July 20th, 1849.

Mr. ROBERT CLAY, President, in the chair.

THE President congratulated his audience on the first occasion of their meeting, and also upon the number of Members enrolled. He regretted that they were disappointed in the lecture announced for this evening by Dr. Brett, owing to an unexpected and unavoidable engagement of that gentleman at York; but was happy to say that Mr. Waldie had, at a very short notice, very kindly consented to supply his place, and by so doing had conferred a great obligation on the Society.

The Secretary read a note of apology from Dr. Brett.

Mr. WALDIE commenced his lecture by commenting on the necessity of an intelligent knowledge of Pharmacy, in order to carry out the instructions of the Physician. He gave an interesting historical sketch of the sciences of Chemistry and Pharmacy, referring the origin of our present knowledge of Chemistry to the Arabians, and noticing some of the principal discoveries which aided the progress of Pharmacy, up to later times. He then pointed out the principles of chemical nomenclature, and the liability of error resulting from ignorance or inattention to the changes in it. The importance of Chemistry was exemplified in the value of drugs and preparations depending on their purity, and, being subject to much variation, in the detection of adulterations, in the manufacture of pharmaceutical preparations, and in chemical manufactures.

Mr. WALDIE adverted to the number of discoveries due to the researches of Chemists, and many of them Pharmaciens, on the Continent, and hoped

that this class of society in Great Britain would equal if not outvie the character of those on the Continent, such being the probable result of Associations like the present combined with the educational efforts of the Pharmaceutical Society.

The President in returning thanks to Mr. Waldie, for his very interesting and suggestive lecture, concurred in his remarks on the nomenclature of the Pharmacopœia. The practice of altering the names, in accordance with the prevailing theories of the day, was an inconsistent and dangerous one; and the college had not always adhered to it. The word *Borax*, for example, was still used, although the salt was described as biborate of soda. If calomel had been also retained, the college would have avoided, in the next Pharmacopœia, the awkward alternative of either departing from their principle or of causing most dangerous confusion between corrosive sublimate and calomel.

Mr. Trumper gave his experience of the new water gas, patented by Mr. White, of Manchester; he had made it for his own use for some months, and was perfectly satisfied with it in point of light, heat, and economy. The process is safe and simple, and the by-products valuable. The cost he estimates at about one-fourth that of ordinary coal-gas; but he is now making some experiments and alterations which he believes will add considerably to its economy, and the result of which he will be happy to communicate to the Society on a future occasion.

Mr. Rawle exhibited samples of pernitrate of iron—the first a thick gelatinous mass, the second a muddy solution, and the third a clear liquid. He stated that these were the results from the same formula, the difference occurring from too rapid action in the first instance. He recommends the use of iron nails, and cooling the mixed acids before using.

Mr. Waldie suggested that the sediment was probably peroxide thrown down in an insoluble state in consequence of too rapid action.

Mr. Edwards believed that it was more probably an insoluble pernitrate of iron, as it was soluble in a large quantity of water, and instanced the two protocitrates of iron as an analogous case.

Mr. E. Evans showed a sample of fictitious myrrh, or gum bdellium, large quantities of which had been recently imported, and offered for sale as myrrh. Mr. Sumner also confirmed the above.

The Secretary exhibited, on behalf of Mr. R. D. Grindley, of Chester, a fine specimen of the *Cotyledon umbilicus* in the fresh flowering state—it is found in the neighbourhood of Chester, also near Liverpool. The plant was described in the *Pharmaceutical Journal* of May last.

The Secretary also mentioned that he had recently examined some of the metal sold as "Brande's Enamel, for stopping decayed teeth," and found it to consist solely of zinc amalgamated with mercury; this being the case, he was not surprised at the complaints that the stopping never hardened thoroughly.

He also showed some fine crystals of benzoic acid, formed in a bottle of "almond flavour," composed of a weak solution of ess. oil of almonds in sp. of wine; the benzoic acid being formed by the oxidation of the oil (hyduret of benzoyle), which he thought rather a singular change to take place in a spirituous solution, which had not been opened during the period of change.

The President announced the next lecture, "On the Starches of Commerce," by Dr. Inman; and the Morning Botanical Lectures at the Institution, by Dr. Dickinson.

The meeting then adjourned to another room for conversation and refreshment.

GLYCERINE IN DEAFNESS.

Mr. Yearsley has written to request us to disabuse the minds of any of our readers who may be impressed with the idea, from reading an article in our last number on that subject, that he, Mr. Yearsley, is in any way mixed up with the introduction of, or an advocate for, the use of glycerine in the treatment of deafness. Mr. Yearsley's own experience appears to be opposed to any such idea, and as to its being preferable to water in the employment of moistened cotton wool in cases of diseased tympanum, he objects to glycerine, as well as all other oleaginous and mucilaginous fluids, "because they are apt to clog and irritate the passage of the ear;" besides, as it is essential the pellet of cotton should be removed every day for the sake of cleanliness, if for no other reason—getting out of its position, for instance—he contends that water, pure distilled water or the saliva of the patient, is quite sufficient for the purpose.

ON THE ELECTRIC LIGHT.

BY MR. JONATHAN WILKINSON.

Will you allow me to make a few observations on a statement or two in the communication of Dr. Letheby in your last number, on the experiments made at Devonport with the view of testing the power of the electric light.

It is stated, that "when Mr. Hearder turned the mirror so as to throw the light towards Bovisand, which was at a distance of 16,470 feet from the column, a candle, six in the pound, projected a similar shadow at thirty feet distance; that is to say, the shadow projected by the electric light at a distance of 16,470 feet, was equal to that cast by the candle at thirty feet; *consequently, their relative illuminating powers are as* 301,401 to 1." Now I believe this to be an error that may be attributed to the haste in which the facts were put together; for you will observe that a mirror was used with the electric light, which had the effect, "when turned towards the clouds, of reflecting the rays of light in the form of the tail of a huge comet, the reflector being the nucleus," or in other words in the form of a cone, the apex of which was the reflector, and the base the cloud or place illuminated.

The error consists in measuring the electric light thrown from the mirror in the form of a comet's tail, in the same manner as the light of the candle, which was not concentrated and reflected, but allowed to diverge in every direction.

The lights ought to be without reflectors, when the squares of their distances are taken as their illuminating powers.

From the experiments I have made and am now making with the electric light, I see no reason to doubt Professor Grove's statement respecting the power of the light he then produced. It may be stated thus: 1,444 mould candles, six in the pound, will weigh 240½ pounds,

costing at 7*d.* without the fraction, £7, which will burn on an average nine hours and a half—equal to 14*s.* 9*d.* per hour for candles, to produce the same amount of light as the electric light he produced, costing, I believe, 2*s.* per hour. The light said to be obtained at Devonport would be nearly 209 times as intense as Professor Grove's; the same amount of light from candles would cost one hundred and fifty pounds per hour! !

I am induced to make these few remarks, because I think it is not necessary to have anything but the truth stated, to place the electric light amongst the most extraordinary applications of science that have been made in our time; for when we see a light so small, pure, and brilliant, which may be enclosed in an air-tight glass vessel whose cubical contents need not be more than a pint, and therefore perfectly innoxious to the atmosphere, producing, at a cost of 2*s.* per hour, a light equal to 1,444 candles, which cost 14*s.* 9*d.* per hour, consuming or altering as much of the surrounding atmosphere as so many persons, we surely require nothing more to satisfy us but the means of continuing such a light for any time it may be required; and I hope the time is not far distant when the public will be put in possession of the electric light in such a state as to be economical and applicable to many useful purposes.

Grimesthorpe, near Sheffield,
July 16th, 1849.

[We have received a communication on this subject from Dr. Letheby, who requests us to correct the error, and observes, that he had at first imagined that the candle as well as the electric light had been focused by a reflector, which was also our impression on first reading the paper. It appears, however, that this was not the case. The circumstance, while it affects the numerical value of the result, cannot influence the general character of the experiments, which were made, not so much for the purpose of arriving at an accurate estimate of the intensity of the electric light, as with the view of ascertaining its general capabilities. Dr. Letheby, who favoured us with the report, was not present at the experiments, which may account for the error.—Ed.]

ON GLAIRINE.

BY M. BONJEAN.

This substance is a vegeto-animal matter, produced at the sulphurous spring of Aix in Savoy. According to M. Duby, who has examined it microscopically, it consists of extremely minute fragments of a plant, of an extraordinarily fine, close, undulating tissue, which is insoluble in water, and has the appearance of an animal remain.

Glairine is produced by the immediate action of the air on the sulphurous water, and is deposited on the pavement of the pumps. It retains a large quantity of water, which it does not lose by long exposure to the air; it is not entirely expelled below 104° Fahr. Thus dried, it is quite colourless, completely inodorous, of a horny appearance, and is reduced to about one-tenth of its weight; when water is added to it, it is rendered again mucilaginous, becomes nearly of its original size, but remains inodorous. When dried and thrown upon burning charcoal, it gives the smell of burnt horn, without any trace of sulphurous acid; and the gases which it yields turn reddened litmus paper blue. The absence, in this experiment, of sulphurous acid, seems to indicate that this substance contains no sulphur; it will soon be shown that it contains so little, that

it can only be isolated by means of ether. Water, alcohol, oil of turpentine, nitric, hydrochloric, sulphuric, phosphoric, oxalic, acetic acids, &c., solution of chlorine, dilute alkalies, all dissolve a small quantity cold, and a little more when heated, but some of them occasion peculiar modifications in it. The nitric, concentrated hydrochloric acid, and liquid chlorine, immediately destroy the grey colour which it acquires out of water, and restore its natural whiteness. Separated from these acids, it becomes more grey by exposure to the air ; other acids do not decolorize it. Alkalies precipitate it from solution in acids in white flocculi, which have a bluish reflexion. The nitric solution, filtered and evaporated to dryness in a small porcelain capsule, leaves a yellowish sharp residue, which is slightly acid, difficultly decomposable in a strong heat, and insoluble in water and in alcohol : glairine does not decompose nitric acid unless it be heated. When hydrochloric acid decolorizes glairine blackened by contact with the air, it assumes a yellow colour, derived from the formation of a persalt of iron. This shows that this organic matter contains peroxide of iron in combination, derived, unquestionably, from the carbonate of iron which the water holds in solution. Concentrated sulphuric acid, instead of decolorizing it, like the before-mentioned acids, imparts to it the colour of wine-dregs, which becomes lighter when acidulated water is added. The caustic alkalies do not act upon it when cold ; but when heated a green colour results, which acids cause to disappear immediately. Bromine also decolorizes it ; but at first it gives it a red colour, and the decolorization of the glairine is not perfect until all the bromine is volatilized. If it should retain a yellow tint from some remaining bromine, washing with distilled water renders it perfectly white. Iodine colours it brick-red ; and this colour does not disappear, either by long exposure to the air, or frequent washings. Alcohol and oil of turpentine dissolve a small quantity, and acquire a slight yellow tint ; alcohol becomes sweetish, and its consistency is sensibly increased. If these two liquids be evaporated to dryness in a porcelain capsule, the lower portion is carbonized by slightly increasing the heat.

Glairine is totally insoluble in ether. If they be mixed in a well-stopped phial, and shaken occasionally during two or three days, the ether when filtered leaves by evaporation small rounded grains of perfectly pure sulphur ; they are yellow and brilliant, of the size of a pin's head, and when thrown on a burning coal, burn with a fine blue flame, and the disengagement of sulphurous acid.

When glairine is gradually heated in a platina crucible, it loses its interposed water slowly, and even begins to be decomposed before it has parted with the whole of it ; towards the end of the calcination it exhales the odour of burnt horn, without any sensible disengagement of sulphurous acid, and leaves a coaly residue. It does not fuse, and it is difficult to incinerate it ; it does not lose its odour by numerous washings with cold water, but imparts a very distinct one to it, with a sweetish taste, without giving it colour ; long boiling takes away the greater part of it ; the solution has a strong smell, and the residue is very small. This liquor when filtered is yellowish, has a sweetish animal taste, is not mucilaginous, and does not coagulate on cooling ; when evaporated to a syrupy consistence in a porcelain capsule, it colours the sides of it strongly yellow. The residue is of a deep yellow, with a slight smell and bitterness ; the sulphuric and nitric acids, whether concentrated or diluted, do not sensibly act upon it. When glairine is subjected to dry distillation in a glass retort placed in a reverberatory furnace, it swells at first, and boils in the water which it retains interposed. This water soon begins to distil by drops, is colourless, has a strong smell of animal matter, and the apparatus is filled with vapours. The odour of burnt horn soon replaces that of

animal matter, and drops of a yellow colour then fall into the receiver. Lastly, when the heat becomes very strong, the retort contains charcoal, and the neck is covered with a black substance, of which a few drops only fall into the receiver with the yellow liquor, and immediately solidify. The yellow distilled liquor has a strong burnt odour and taste, with slight bitterness. It reddens litmus feebly, and dissolves in all proportions in water and alcohol. Ether does not dissolve it, but separates a small quantity of yellow fatty matter, which it leaves by evaporation ; it is insoluble in water, but very soluble in alcohol.

The coaly residue of the distillation, treated with distilled water, yielded a slightly alkaline solution ; during distillation, the gases disengaged restored the blue colour of reddened litmus. The dry residue of the distillation was a very light, black, and friable charcoal, which yielded 0.75 of ash, composed of silica, carbonate of lime, and peroxide of iron. No trace of iodine could be detected.

The preceding experiments on glairine lead to the following conclusions : it contains very little nitrogen and no iodine ; it dissolves sparingly in water, alcohol, oil of turpentine, and rather more readily in concentrated acids, from which the alkalies precipitate it in bluish-white flocculi ; heat in all cases increases the solvent power of the liquids ; it is quite insoluble in ether, which isolates perfectly the small quantity of sulphur which it retains interposed between its molecules ; it becomes rapidly of a more or less blackish grey colour when taken from the water and exposed to the air ; but it is sufficient to treat it with nitric or hydrochloric acid, bromine or chlorine, to restore its natural whiteness ; sulphuric acid, far from decolorizing it, imparts to it the colour of wine-lees ; the concentrated alkalies render it green when heated, and the alkalies destroy it ; when in water it has but very little odour, but as soon as taken from it, it acquires a most disgusting smell, which is not dissipated by long exposure to the air, at least while it retains a little water ; nor is it got rid of by much washing with cold water, or by long boiling, although in the latter case the greater part of it disappears. Lastly, it becomes perfectly inodorous by thorough drying in a stove, assumes a horny appearance, and is reduced to about one-tenth of its weight.—*Journ. de Ph. et de Ch.* and *Phil. Mag.*

ON GLAIRIDINE.

BY M. BONJEAN.

The author observed that when the sulphurous waters above described become mixed with rain-water, another vegeto-animal matter appears, to which he has given the name of *glairidine*.

The principal characters of this substance are, that it is of a deep grey colour, instead of being colourless like glairine ; it is inodorous, and remains so even when exposed to the air. Long exposure to the air does not alter its colour, but if a glass bottle be immediately filled with it, it soon acquires a smell, which in a few days becomes as disagreeable as that of glairine taken from water. If it then be taken from the bottle and exposed to the air, it becomes quite inodorous, and dries perfectly in a few days ; on the contrary, it has been shown that glairine does not lose its interposed water till exposed to a heated stove. Glairidine is not decolorized either by any acid or by liquid chlorine. Like glairine, it renders hydrochloric acid yellow on account of the peroxide of iron which it contains. Water, alcohol, oil of turpentine, and the acids, dissolve a small quantity of it : it is insoluble in ether, it separates sulphur, but in so minute traces, that to perceive them it is requisite to operate on a great quantity of the matter. The caustic alkalies do not render it green,

either cold or hot. If it be thrown on a filter, it retains a little water, and when afterwards dried on a stove, it loses only two-thirds of its weight. In this state, instead of having a horny appearance, like glairine, it presents a uniform, friable, solid mass, and does not swell in water. The water which runs through the filter is as inodorous as the substance itself, and it contains a very small quantity of *zoïodine*. When decomposed in a glass tube, it exhales the odour of burnt horn, and yields gases which strongly restore the blue colour of reddened litmus. Lastly, glairidine yielded by analysis very evident traces of iodine, which, as already stated, glairine did not.—*Ibid.*

ON THE RELATIONS EXISTING BETWEEN SUGAR AND TARTARIC ACID.

BY M. BOUCHARDAT.

Sugar and tartaric acid possess characters in common which are well worthy the attention of Chemists. M. Bouchardat thus describes them:—

When sugar or tartaric acid is thrown on to incandescent coals, in either case empyreumatic products are given off, which are distinguished by the odour of caramel.

When pounded in a mortar, in the dark, both crystallised sugar and tartaric acid emit a manifest electric light. The other organic acids, and citric acid in particular, do not possess this property. It therefore follows that we may thus distinguish tartaric from citric acid, and ascertain whether the latter has been adulterated with the former.

Sugars in solution act upon polarised light, possessing in a high degree the power of rotating the plane of vibration. Cane-sugar, which has been changed by acids under the influence of heat possesses this power, and the direction of the rotation may even be altered by the action of the acid. Tartaric acid, either free or combined with water, with bases, or with boracic acid, presents remarkable instances of variations of rotatory power.

A concentrated solution of citric acid being devoid of rotatory power, nevertheless acquires that property if mixed with tartaric acid. It therefore follows that we may also by this means detect the adulteration of citric with tartaric acid.

In addition to the characters possessed in common by sugar and tartaric acid, very frequently the decomposition of these two substances gives rise to similar products.—*Journal de Pharmacie.*

ON THE ESTIMATION OF SUGAR OF MILK, AND THE DETERMINATION OF THE RICHNESS OF MILK.

BY M. POGGIALE.

None of the processes hitherto known being capable of furnishing, in a rapid and accurate manner, the determination of the richness of milk, I thought that if it were possible to estimate quickly one of its necessary constituents by a process of measurement, without using the balance, the problem would be solved. I think I have obtained this result by determining the proportion of sugar of milk.

Several specimens of pure milk, which I obtained for the purpose, were submitted to chemical analysis, and the following represents the mean of ten results :—

Water	862.8
Butter	43.8
Sugar of Milk	52.7
Caseine	38.0
Salts	2.7
	1000.0

Thus, according to my experiments, one thousand parts of milk contain 52.7 parts of sugar. M. Boussingault, in a series of observations, found a mean of 50 ; a difference no doubt resulting from a different mode of operating. The quantity of sugar contained in milk is therefore considerable, and is subject to but slight variation.

The process which I propose is an application of that of M. Barreswil for the purpose of estimating the sugar of milk. This kind of sugar, in common with grape sugar, reduces the salts of copper, and it may be easily estimated by applying this re-action. The proportion of salt of copper decomposed will give the quantity of sugar of milk.

Preparation of the Test.—It is prepared by adding bitartrate of potash to a solution of sulphate of copper, and dissolving the precipitate which is formed by means of caustic potash. We have then to determine with care the strength of the alkaline solution, which is effected by ascertaining the quantity of sugar required to decolorize a given quantity of the liquor. It is important to observe, that in this operation sugar of milk, and not cane sugar, is to be used.

I have made a few experiments with the view of establishing a test liquor, the value of which shall be known. The following proportions have always afforded a liquor twenty cubic centimetres of which correspond to two decigrammes of whey.

Take of—Crystallised sulphate of copper	...	10 parts
Ditto bitartrate of potash	...	10 "
Caustic potash	.....	30 "
Distilled water	.....	200 "

The liquid, after being filtered, is limpid, and of an intense blue colour.

Preparation of the Whey.—In estimating the sugar of milk it is necessary to separate the fatty matter and the caseine by coagulation. This is easily effected by putting fifty or sixty grammes of the milk into a flask, adding a few drops of acetic acid, and then raising the temperature to 40° or 50° Cent. A transparent liquid will be obtained by filtration. According to my experiments, 1000 parts of milk yield 923 parts of whey, 1000 parts of which latter contain about 57 parts of sugar of milk.

The testing of the Whey.—Twenty cubic centimetres of the liquid to be tested is transferred by means of a pipette to a flask, which is preferable to a capsule because the change of colour can be readily perceived. The liquid is to be brought to the boiling point. On the other hand, a burette, each division of which is the fifth of a cubic centimetre, is to be filled with the whey; and this is to be added, drop by drop, to the test liquor, keeping it continually agitated and heated from time to time, until the blue colour has entirely disappeared. In the first instance a yellow precipitate of hydrated suboxide of copper is formed, which speedily becomes red, and is deposited in the flask. When the operation is finished, the quantity of whey which has been used is observed, and by a rule of proportion the weight of sugar in a thousand grammes of whey is determined.

We have here assumed that a thousand grammes of whey contains fifty-seven grammes of sugar, but it will be necessary to make allowance for variations to the extent of a few grammes. Most of the frauds which are practised with reference to milk would be discovered by estimating the quantity of sugar present, as they would be effected by the addition

of water. Nevertheless it might happen that the cream was removed without any addition of water, or that grape sugar or sugar of milk was added. In these cases, I ascertain by a simple and expeditious process the quantity of fatty matter, by adding acetic acid to the boiling milk and agitating them together. After it has cooled, ether is added, which dissolves the butter; and the etherial solution is evaporated when it yields the butter. It is sometimes desirable to verify the results by repeating the estimation of the sugar of milk; and the arrangements being prepared, and the quantities approximatively known, this may be done in a few minutes.—*Journal de Pharmacie.*

ON THE COMPOSITION OF HONEY.

BY M. SOUBEIRAN.

The honey of bees contains two kinds of sugar, one solid and the other liquid. The former of these is considered to be identical with the granular sugar which is deposited, after long standing, from solution of grape sugar, or from cane sugar which has been changed by the action of acids. The liquid sugar of honey has hitherto been but little studied. M. Biot, however, has shown that it possesses the power of rotating a ray of polarized light to the left.

My experiments have tended to prove that there are, in fact, three different kinds of sugar in honey: 1st, Granular sugar, or the glucose of Chemists; 2ndly, A sugar possessing the power of rotation to the right, and which is capable of having this power changed by acids; and, 3rdly, A sugar which rotates to the left, but with nearly double the energy of that which has been changed by acids.

I have found the sugar that rotates to the right, and which may be changed by acids, in common honey, but it especially abounds in the liquid honey as contained in the honey-comb. The proportion is so large that a solution of this honey, having a power of rotation of $+0.96°$ to the right, acquires, by the action of acids, the power of rotating in the opposite direction to the extent of $13.78°$ to the left.

I designate as *liquid sugar of honey*, the fluid part which is extracted by submitting honey to the action of the press. My experiments have been made on sugar which was thus obtained in the year 1841, and which has been kept until the present time without undergoing any change—without giving any indication of crystallisation. This circumstance is sufficient to distinguish it from that which has been changed by acids, as the latter always solidifies into a mass of granular crystals after being kept for some time. The liquid sugar of honey presents several characters in common with cane sugar which has been changed by acids. Like the latter it is uncrystallisable, and may be converted into the condition of barley-sugar, being transparent, solid, and easily fusible. It is also, in common with cane sugar that has been changed by acids, very susceptible of the action of alkalis, by which it is easily decomposed. Both these kinds of sugar have the same composition, and combine in the same proportions with the alkalies. Thus in most of their characters these two sugars assimilate each other, but they may be distinguished by the circumstances that the liquid sugar of honey absolutely refuses to assume the crystalline condition, and that it possesses the power of rotation upon a ray of polarized light to nearly double the extent that the other kind of sugar does.

The results of my experiments may be thus briefly recapitulated:—

Honey is composed of a mixture of three different kinds of sugar, of which one is the granular sugar previously known.

Another of the sugars present in honey resembles, in many of its

characters, cane sugar which has been changed by acids, but it is distinguished by the circumstances that it never assumes the granular state, and that it possesses a left-handed rotatory power to a much greater extent than the other.

The power of rotation which the liquid sugar of honey possesses, at a temperature of 55.4° Fahr., and for a column of 100 millimetres (3.937 inches) in length, is equal to 33.103°, while that of cane sugar changed by acids, under similar conditions, is only equal to 18.933°.

The liquid sugar of honey retains the power of rotating the ray of light to the left even after it has been rendered solid (by evaporation.) There are but a small number of bodies that possess this character.

The third kind of sugar found in honey is distinguished from granular sugar by its having its power of rotation changed by the action of acids, and it is distinguished from the liquid sugar of honey by its possessing a right-handed rotation. The proportion of this sugar, which is very considerable in the liquid honey as it exists in the honey-comb, becomes much smaller after the honey has been kept for some time, and ultimately it entirely disappears.—*Comptes Rendus.*

SOME FACTS RELATIVE TO THE SPHEROIDAL STATE OF BODIES, FIRE-ORDEAL, INCOMBUSTIBLE MAN, &c.

BY P. H. BOUTIGNY (D'EVREUX)*.

In the year 241, Sapor or Chapour ordered the Magi to do all in their power to persuade the people and bring them back to the faith of their ancestors. It was then that one of the pontiffs of the dominant religion, Adurabâd-Mabrasphand, offered to submit to the fiery ordeal . . . "He proposed that eighteen pounds of melted copper, issuing from the furnace, all hot, should be poured on his naked body, on condition, that if he was not injured by it, the unbelievers should yield to so great a miracle. The trial was said to be attended with such success, that they were all converted." The historian adds, with an air of doubt, certainly allowable in such a matter, "We see that the religion of Zoroastre had also its miracles and its legends †."

Now this fiery ordeal, undergone with such success by Adurabâd-Mabrasphand, is in plain truth an experiment of primitive facility and simplicity, and which is anything but miraculous.

I stop here an instant, for I fancy that I see the smile of incredulity rise on the lips of some who do me the honour of listening to me ;—that smile, so discouraging to one who is insincere, but which only heightens the ardour of him who intends to practise no deception, and who does all in his power not to deceive himself.

To such persons then I would offer this encouragement ; the little that I have still to relate appears improbable, but it is true, and that is enough. Having said this, I continue.

In France, in England, in Italy, wherever I have had occasion to speak of bodies in the spheroidal state, I have met with persons who have put to me this question : May there not be some connexion between these phenomena and that presented by men who run barefooted over liquid metal (?) still incandescent, or who plunge their hand into molten lead, &c. ‡? To all I have answered, Yes, I believe that there is an intimate

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* From the *Comptes Rendus* for May 14, 1849.

† *Dictionnaire Historique, Critique, et Bibliographique*, t. xxvii., p. 417.

‡ I have alluded to these facts in the work entitled *Nouvelle Branche de Physique, ou Etudes sur les Corps à l'Etat Sphéroïdal*, p. 36.

relation between all these facts and the spheroidal state. And then, in my turn, I put this question : Have you witnessed the fact which you tell me ? And the answer has invariably been in the negative.

I avow that all these *on-dits* and the marvellous legends which I had read in various works* on the fiery ordeal and incombustible men, admitted without reserve by some, obstinately denied by others, excited my curiosity greatly, and gave me a great desire to verify all these phenomena, and to recall them to the recollection of contemporary observers; for, alas ! all this is as old as the world ; *nil sub sole novum.*

I wrote first to my friend Dr. Roché, who passes his life in the midst of the blast furnaces of the Eure, and who is the physician of a portion of the Cyclopean population who feed them. I requested of him precise particulars. All that he could ascertain was, that a man named La Forge, of from thirty-five to thirty-six years of age, very corpulent, walked step by step barefooted on the pigs after the casting ; but he had not seen this. This was not enough to dispel my doubts.

I then applied to a foundry at Paris, where I was laughed at, and shown the door. I retired, hanging down my ears, thinking over the difficulties of verifying a single fact, and such a simple one.

Subsequently I was fortunate enough to meet with M. Alph. Michel, who lives in the midst of the forges of Franche-Comté. M. Michel promised me, with the greatest kindness, to inquire into these facts, and to report upon them if desired.

The following is an extract from the letter which he did me the honour to write to me, dated the 26th of last March :—

" On my return home, I did not fail to obtain information from the workmen of the facts of the case (the immersion of the finger in the incandescent melted metal); and most of them laughed in my face, which did not deter me. Lastly, being one day at the forge of Magny, near Lure, I put the question again to a workman, who answered that nothing was more simple ; and, to prove it, at the moment when the metal in a state of fusion issued from a Wilkinson, he passed his finger into the incandescent jet. A person employed in the establishment repeated the experiment with impunity; and I myself, emboldened by what I saw, did the same . . . I may observe that, in making this trial, none of us moistened his finger.

"I hasten, Sir, to acquaint you with this fact, which seems to support your ideas on the globular state of liquids ; for the fingers being naturally more or less humid, it is, I think, to this moisture passing to the spheroidal state, that we must ascribe their momentary incombustibility."

The following are the experiments which I have made :—

I divided or cut with my hand a jet of melted metal of five to six centimetres, which escaped by the tap; then I immediately plunged the other hand in a pot filled with incandescent metal, which was truly frightful to look at. I involuntarily shuddered, but both hands came out of the ordeal victorious. And now, if anything astonishes me, it is that such experiments are not quite common.

I shall of course be asked, What precautions are necessary to preserve oneself from the disorganising action of the incandescent matter ? I answer, None ;—only to have no fear, to make the experiment with confidence, to pass the hand rapidly, but not too rapidly, in the metal in full fusion.

Otherwise, if the experiment were performed with fear, or with too great rapidity, the repulsive force might be overcome which exists in

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* *Des Erreurs et des Préjugés Répandus dans les Diverses Classes de la Société*, t. xii., p. 183.

incandescent bodies, and thus the contact with the skin be effected, which would undoubtedly remain in a state easy to understand.

To form a conception of the danger there would be in passing the hand too rapidly in the metal in fusion, it will suffice to recollect that the resistance is proportionate to the square of the velocity, and, in so compact a fluid as liquid iron, this resistance increases certainly in a higher ratio.

The experiment succeeds especially when the skin is humid ; and the involuntary dread which one feels at facing these masses of fire, almost always puts the body into that state of moisture so necessary to success ; but by taking some precautions, one becomes veritably invulnerable. The following is what has succeeded best with me : I rub my hands with soap, so as to give them a polished surface ; then, at the moment of making the experiment, I dip my hand into a cold solution of sal-ammoniac saturated with sulphurous acid, or simply into water containing some sal-ammoniac, and in default of that, into fresh water.

Regnault, who has occupied himself with this subject, says, " Those who make a trade of fire handling and holding it in the mouth, sometimes employ an equal mixture of spirit of sulphur, of sal-ammoniac, of essence of rosemary, and onion-juice ;" all volatile substances, we see, which, in evaporating, render a certain portion of heat latent.

Let us now seek the rational explanation of these facts.

We have the formula $m\ c\ t$, which gives the quantity of heat contained in any body.

Let m be the mass expressed in kilogrammes.

c the specific heat of the body.

t its temperature.

But here the factor m must be abstracted, because there is no contact between the hand and the metal in fusion; and the experiment presents no difference, being made either with ten kilogrammes of metal, or with 1000 kilogrammes. The sensation which is felt is the same in either case, and this is readily conceived, knowing the repulsive force of incandescent surfaces which is opposed to the contact of any body.

The finger or the hand is then isolated in the midst of the mass in fusion, and thus preserved from the disorganizing action of the incandescent matter. I repeat, that the mass must be abstracted.

There remain the two factors $c\ t$. I will suppose, and it is a sufficient approximation, that the value of $c = 0.15$, and that of $t = 1500$ degrees, the temperature of the metal in fusion ; now the product of 1500 degrees $\times\ 0.15 = 225$. Thus the epidermis of the experimenter would only be exposed to 225 degrees of heat. Undoubtedly this is a respectable quantity of caloric, but it is too high, as we shall see.

There is no contact between the hand and the metal ; this, in my estimation, is a fact positively established. If there is no contact, the heating can only take place by radiation — and it is enormous, it must be acknowledged ; but if the radiation is annulled by reflexion (and it is so) it is as if it did not exist, and definitely, the operator is, so to say, placed in normal conditions.

I think that I established, a long time ago, the fact that water in the spheroidal state has the property of reflecting radiating heat *, and that its temperature never attains that of its ebullition ; whence it follows that the finger or the hand becoming humid, cannot rise to the temperature of 100° Centig., the experiment not continuing long enough to permit the humidity to evaporate entirely.

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* *Nouvelle Branche de Physique, ou Etudes sur les Corps à l'Etat Sphéroïdal*, pp. 24 *et seq.* and 132 *et seq.* See also our two letters to the Académie des Sciences, dated the 14th aud 21st July, 1845. In the places indicated will be found the explanation of this phenomenon.

To reeapitulate what I have stated on this point, I say,—In passing the hand into any metal in fusion, it beeomes isolated ; the humidity which covers it passes into the spheroidal state, refleets the radiating caloric, and does not become heated enough to boil. This is all.

I was right then in saying at the outset, this experiment, dangerous in appearance, is almost insignificant in reality.

I have often repeated it with lead, with bronze, &e., and always with the same sueeess*.—*Phil. Mag.*

ON ANIMAL CHARCOAL AS AN ANTIDOTE.

BY B. HOWARD RAND, M.D., OF PHILADELPHIA.

In the *Transactions of the Medical Society of London*, new series, vol. i,† is a paper by Dr. A. B. Garrod, detailing some experiments, in which he employed purified animal charcoal as an antidote. This is prepared from ivory black, by digesting it in dilute chlorohydrie aeid to remove the earthy matters, afterwards washing and heating it to redness in a covered crucible. The subjects of his experiments were dogs, rabbits, and guinea-pigs. He administered large doses of opium, belladonna, aconite, nux vomica, delphinium, stavesacre, white hellebore, and their alkaloids, as well as digitalis, hemlock, tobacco, elaterium, ipecacuanha, hydrocyanic acid, cantharides, and arsenious acid, without injurious consequences, when suffieient animal charcoal was given simultaneously with them, or in some cases before the peculiar effects of the drug were developed. It also prevented, but less completely, the action of the bichloride of mercury, and of the salts of copper and lead.

Dr. Garrod concludes from his experiments :—

1st, That animal charcoal has the power of combining in the stomach with the poisonous principles of animal and vegetable substances, and that the eompounds thus produced are innoxious ; therefore, when given before these poisons have become absorbed, it will act as an antidote.

2d. That animal charcoal will absorb some mineral substanees, and render them inert ; but so large a quantity of the charcoal is required, that it is not so well adapted for many poisons of this class as their own special antidotes ; the effects of arsenic, however, appear to be better eombated by this than by any other article.

3d. That a certain amount of animal charcoal is required, about half an ounce to each grain of morphia, strychnia, or any other alkaloid ; but, of course, much less for the substances from which they are obtained, as opium, nux vomica, &c., a scruple of nux vomica not requiring more than half an ounce of charcoal.

4th. That the antidote itself exerts no injurious action on the body.

The method of preparing pure animal charcoal from ivory black, before mentioned, is tedious and wasteful, only ten per cent. being obtained, while the amount of acid used is considerable. A very good and pure charcoal is obtained by calcining leather scraps or blood with pearl-ash, washing and re-heating in a close crucible—it was this kind of charcoal which was principally used in the experiments to be detailed. Much of the discrepaney of experimenters with this substance, is undoubtedly due to their use of an impure specimen of it.

With a view of ascertaining more accurately the value of the proposed

* The experiments on the cast iron were made in the foundry of M. Davidson, at La Villettee ; and on the bronze, in that of M. Nérat, Rue Pierre-Levée. I am happy to have an opportunity of publicly thanking these gentlemen for their kind assistance.

† Condensed in *Braithwaite's Retrospect*, vol. xiii.

antidote, the writer performed a number of experiments, from which the following are selected as having the most direct bearing upon the subject :—

1. One grain of pure morphia was swallowed with about an ounce of pure animal charcoal, in warm water ; no narcotic symptoms supervened, but there was some gastric irritation, which subsided in the course of the day.

2. One grain of sulphate of morphia was digested with pure animal charcoal until all bitterness was removed; the liquid, filtered off and swallowed, produced no effect.

3. Ten grains of extract of belladonna were swallowed with two drachms of the charcoal ; there followed vertigo, dilated pupils, dimness of vision, exceeding dryness of the throat, and desire to sleep, all of which symptoms were relieved by the spontaneous vomiting of a very acid matter, and the use of stimuli. The pupil remained dilated through part of the next day.

4. The last experiment was repeated, an antacid having been premised, and the proportion of charcoal being doubled. Some dryness of the throat followed, but with no other symptom of the influence of the drug.

5. Fifteen grains of powdered digitalis were taken, with three drachms of the animal charcoal, without the slightest disturbance of the functions.

6. Twelve drops of the officinal hydrocyanic acid were swallowed, with two drachms of the pure charcoal, without a sedative result.

7. One grain of strychnia, dissolved by the aid of a drop of chlorohydric acid, was digested with animal charcoal until all bitterness was removed. The solution, filtered and swallowed, produced no effect ; a similar solution, evaporated and tested with nitric acid, gave no red tinge.

8. One grain of strychnia was swallowed, with an ounce of pure animal charcoal ; no effects due to the strychnia could be perceived.

9. The purgative extracts were next tried, but produced no effect when sufficient animal charcoal was taken.

10. Camphor and musk were removed by animal charcoal from their tinctures, so far that they did not precipitate on the addition of water.

11. Phosphorus was removed from its ethereal solution by the charcoal.

12. Iodine was so far removed from its tinctures and compound solution as not to strike a blue colour with starch ; and the iodine could not be liberated from the animal charcoal at a red heat.

13. Arsenious acid and a solution of arsenite of potassa were apparently unaffected, either in the hot or cold solution, by animal charcoal. This result, although it agrees with those of MM. Wapen and Graham, does not with the observations of Dr. Garrod, who states that animal charcoal "has greater power of removing arsenic from its solution than the hydrated sesqui-oxide of iron."

14. A solution of the bichloride of mercury being treated with animal charcoal, gave, on filtration, no precipitate with ammonia.

In conclusion, we are perhaps justified in drawing, from the present state of our knowledge on this subject, the following conclusions :—

1st. That animal charcoal has the power of withdrawing, when used at a proper temperature and in sufficient quantity, most, if not all, known vegetable and animal poisonous principles, and certain mineral poisons, from their solutions.

2d. That given at the same time with, or shortly after these poisons have been swallowed, it prevents their deleterious action.

3d. That given in cases of poisoning, it can exert no injurious influence, but, on the other hand, promotes vomiting, entangles the poison, and protects the coats of the stomach against it.

4th. That although it cannot be substituted for the usual antidotes in poisoning by mineral substances, yet it may be usefully employed in conjunction with them, or in their absence.—*Medical Examiner* and *Edinburgh Monthly Journal.*

ON AN AVENTURINA-LIKE PORCELAIN GLAZE.

BY A. WACHTER.

Wöhler observed, that aventurina-glass obtains its gold-like brilliancy from crystallised metallic copper, separated from the base, which has been coloured brown by oxide of iron. In the aventurina-like porcelain glaze a similar effect is produced by the crystalline separation of green oxide of chrome from the brown ferruginous base.

The glaze is prepared in the following manner :—

31 parts of finely-washed dry porcelain-earth of Halle;
43 ditto ditto quartz-sand;
14 ditto ditto gypsum;
12 ditto ditto pieces of broken porcelain, are mixed with 300 parts of water, and well distributed and mixed with it, by repeatedly passing them through a canvass sieve.

To this paste, whilst being stirred, are successively added the watery solutions of 19 parts bichromate of potash;
100 " sulphate of iron;
47 " sugar of lead; and then as much liquid ammonia as will throw down all the iron. The potash and ammonia salts are removed by frequently washing the whole with spring-water.

The porcelain vessels having been heated to redness are dipped into the thus obtained paste-like mixture of the ingredients just mentioned, with chromate of lead and iron, and afterwards burnt in the porcelain furnace. They are then covered with a brown enamel, which, by the reflected light, appears to contain a large quantity of small flakes of gold.

A fragment of the glaze appears under the microscope, by transmitted light, to be a brownish transparent glass, in which many transparent, green, hexagonal laminæ of oxide of chrome, and some brownish ones (perhaps oxide of chrome and iron), are floating. Whilst the glaze is gradually cooling in the porcelain furnace, the oxide of chrome crystallises from the glaze (a silicate of potash, lime, and alumina), which is saturated with oxide of iron, and appears, through the brownish base, to be of a gold colour. If the aventurina-like glaze be mixed with an equal quantity of colourless porcelain glaze, the vitreous base does not appear after the burning to be brown, but light greenish gray, and the precipitated crystalline flakes have, in the reflected light, their natural green colour.—*Ann. der Chemie und Pharm.*

ON THE PREPARATION OF HYDROBROMIC AND HYDRIODIC ACIDS.

BY C. H. MÈNE.

Hitherto hydrobromic and hydriodic acids have been prepared by decomposing the phosphurets of bromine and iodine by a small quantity of water. Now, without mentioning the considerable loss of substance, the serious and frequent accidents which occur in this reaction frequently prevent Chemists from preparing these gases, and consequently of studying their properties. The means recently proposed, as the essential oil of lemon, or naphthaline, being either rare, expensive, or of difficult preparation, I have considered it of sufficient importance to describe a new method of preparation, which I have recently employed with success, and which presents no danger, and is not accompanied by any loss.

To liberate hydrobromic acid gas, I employ the crystallized hypophosphite of lime obtained in the preparation of phosphuretted hydrogen from phosphuret of calcium. It is placed in a flask or retort with a

small quantity of water; after which I add, by means of a long funnel, some liquid bromine; the reaction takes place instantly, without the assistance of heat, and hydrobromic acid is disengaged, and may be collected over mercury. It is merely requisite to place in the neck of the retort or the flask some pieces of cotton or of amianthus, in order to retain any bromine vapour which might be volatilized by the heat. The reaction of the bromine upon the hypophosphite of lime in presence of water will be easily understood; the water is decomposed, 4 parts of oxygen pass to the hypophosphite of lime, converting it into neutral phosphate, and the 4 parts of hydrogen are transferred to the bromine, forming hydrobromic acid:—$4Br + PhO, CaO + 4HO = PhO_5\ CaO + 4HBr$.

To prepare hydriodic acid, I use the same salt and follow the same mode of preparation, only it is requisite to assist the reaction by a little heat. The decomposition is similarly expressed by the equation

$$4I + PhO, CaO + 4HO = PhO_5 + 4HI.$$

Sulphite of soda may likewise be employed for the preparation of these two gases. With this salt it is not necessary to add water, as in general the crystals of commerce contain a sufficient quantity; I merely dip them in water, and then add immediately the bromine or iodine. It is necessary to assist the reaction by heat. The reaction is very simple. The bromine or iodine decomposes the water in presence of this salt; 1 equiv. of hydrogen is transferred to the bromine, forming the gas in question, and the oxygen converts the sulphite into sulphate:—

$$SO_2, NaO + HO + Br \text{ or } I = SO_3\ NaO + BrH \text{ or } IH.$$

It needs scarcely to be observed that the last method is preferable, as the sulphite of soda is commonly met with in commerce, whilst the preparation of the hypophosphite of lime is very troublesome. In the course of two weeks I have disengaged from 20 to 25 litres of these two gases without having met with the least accident; whilst with the old process I have frequently had explosions, which would certainly have produced serious consequences if the quantities operated upon had been at all considerable.

The proportions to be employed for the preparation of these two acids are—

By the Hypophosphite of Lime.		By the Sulphite of Soda.	
Water	1	Water	1
Iodine or bromine	5	Iodine or bromine	3
Hypophosphite in crystals	4	Crystallized sulphite of soda	6
	For 10 parts.		For 10 parts.

Comptes Rendus and *Chem. Gazette.*

ON THE EXPRESSED OIL OF WHITE AND BLACK MUSTARD SEEDS.

BY ST. DARBY.

The seeds of *Sinapis nigra* and *alba* contain a considerable quantity of a fat inodorous oil, of the chemical nature of which little more has been hitherto known than that the fatty acids contained in it are combined with oxide of glycerule. I. Fontanelle * obtained by expression from the mustard seed, probably *Sinapis nigra*, one-fifth of its weight of an amber-yellow bland oil, of 0.9202 specific gravity, congealing at below 32° Fahr., and soluble in four parts of ether and 1000 parts of alcohol of 0.833 specific gravity. According to Henry and Garot, it contains a solid fat, crystal-

* Berzelius *Jahresbericht*, Bd. vi., s. 263.

lizable in white pearly laminæ, fusible at 248° Fahr., and which cannot be saponified by alkalies. The recent examinations of the fatty acids, and especially of those represented by the formula (C H) n + O_4 have nearly finished the series; for by the beautiful investigations instituted by Gottlieb about the oleic acid of the drying oils, those of Saalmüller about the ricinoleic acid, of Walter about moringic acid, &c., &c., a number of fatty acids have been discovered, which do not belong to the above mentioned series; they contain a smaller number of atoms of hydrogen than of carbon, and it appears that their number is not less than that of the acids of the series n (C H) + O_4. The following examination of the fat oil contained in the black and white mustard, although imperfect and deficient with regard to liquid fatty acids contained therein, yet proves the existence of a new acid, which belongs to the same series as the oleic acid of the non-drying oils.

1. *Fatty Oil of Sinapis alba.*

This oil was obtained by expression from the ground and slightly heated seeds of the officinal *Semina erucæ*. It is a thin liquid, of a light amber-yellow colour, inodorous, and possessing a bland taste; it does not solidify, even during the severe cold of the winter, but merely becomes viscid and turbid. If heated in a test tube, acroleine is developed, a proof that the contained fatty acids are combined with oxide of glycerule.

It was heated with caustic soda lye till it was perfectly saponified; the soap thus obtained dissolved perfectly in water, which refutes the statement of Fontanelle, that the oil contains a solid, non-saponifiable, fat. The watery solution of the soap was mixed with common salt, the precipitated soap again dissolved in water, and again precipitated by common salt; this was once more repeated till the soap was white and free from glycerine. The thus purified soap yielded, when decomposed by diluted muriatic acid, a liquid mixture of the fatty acids, which, after having been carefully washed, first with hot acidulated, and then with hot pure, water, was converted, by digestion with finely ground oxide of lead in the water-bath, into basic compounds of oxide of lead. The thus obtained plaster was digested with ether, as long as the latter took anything up; the residue was then treated with muriatic acid and alcohol, the chloride of lead separated by filtration, the alcoholic solution submitted to distillation, and the residual acid washed with warm water till the adhering muriatic acid was removed. It was then repeatedly crystallized from alcohol till it had become perfectly white, and assumed a fixed melting point. This was at 93.2° Fahr., and did not vary even after the acid had been recrystallized six times. The acid was now melted in the water-bath, and the portion which still remained fluid during refrigeration, poured off from the already congealed portion. The melting and congealing point of both portions was exactly the same. Either of them melted at 93.2° Fahr., and congealed at 91.4° Fahr. The acid crystallized out of the alcoholic solution in brilliant needles. It was perfectly dried, and burnt with oxide of copper, and found to have the following composition:—

	I.	II.	III.
Carbon	77.8	77.5	77.3
Hydrogen	12.5	12.9	12.4
Oxygen	9.8	9.7	10.3
	100.0	100.0	100.0

Assuming the atomic weight from the analysis of the salts of silver, lead, and baryta, the composition of the fatty acid of the oil of the white mustard seed will be represented by the formula

$$C_{44}\ H_{42}\ O_4 = C_{44}\ H_{41}\ O_3,\ H\ O.$$

This required in 100 parts,

		Calculated.
44 eq. Carbon	264	78.1
42 eq. Hydrogen	42	12.4
4 eq. Oxygen	32	9.5
	338	100.0

A fatty acid of this composition, with a melting point of 93.2° Fahr., has hitherto been unknown; and as it was first discovered in the *sem. erucæ officinalis*, it may be denominated *erucic acid*. It stands next to the *Ben acid* described by Völker, if the alteration made in the formula by Strecker be considered to be correct.

		Melting point,
Ben acid	$= C_{44} H_4 O_4$	168.8°
Erucic acid	$= C_{44} H_{42} O_4$	93.2°

The following is the composition of several of the erucates :—

Erucate of silver $= C_{44} H_{41} O_3$, Ag O
Erucate of lead $= C_{44} H_{41} O_3$, Pb O
Erucate of baryta $= C_{44} H_{41} O_3$, Ba O

In order to determine whether the seeds of the white mustard always contain the same solid fatty acid, some oil was procured from another source, and this also yielded an acid whose melting point was 93.2° Fahr., and the other qualities of which entirely coincided with those of the erucic acid.

Having thus established the composition of the solid fatty acid of the oil of white mustard, I next examined that part of the lead compound which is soluble in ether. After expelling the ether, it was mixed with muriatic acid and alcohol, the precipitated chloride of lead separated by filtration, the alcohol driven off by evaporation, and the muriatic acid removed from the crude oleic acid by water. The baryta salt was prepared in the manner prescribed by Gottlieb. The analysis of this salt furnishes numbers which, as regards the proportion of baryta, do not agree with the composition of the oleate of baryta.

$C_{38} H_{36} O_4$, Ba O, this requires

38 eq. Carbon	228	61.2
36 eq. Hydrogen	36	9.6
4 eq. Oxygen	32	8.8
1 eq. Barytum	76.6	20.4
$C_{38} H_{36} O_4$, Ba O	372.6	100.0

The oleate of baryta, $C_{36} H_{33} O_3$, Ba O, requires 61.79 carbon. 9.4 hydrogen, and 21.9 Ba O: there is therefore a difference of two per cent. in the proportion of baryta, which, according to what is stated before, proves either the existence of a new acid, different from the oleic acid of the non-drying oils, or an admixture of some other acid of greater atomic weight, the lead salt of which is also soluble in ether.

2. *Fatty Oil of Sinapis nigra.*

By treating the oil expressed from the seeds of *Sinapis nigra* in the same way as that of *sem. erucæ*, three fatty acids were discovered in it, viz., stearic acid, erucic acid, and a liquid fatty acid, which appears to be identical with the acid just mentioned, considering that the baryta salt prepared from it contained, even after repeated recrystallizations, only 20.4 per cent. of baryta.

The lead salt, insoluble in ether, contains two solid fatty acids, stearic

acid and erucic acid, which were separated from one another by crystallization.

The portion first crystallized assumed, after frequently repeated recrystallizations, a melting point at somewhat above 158° Fahr., and congealed again at 158° Fahr.

The analysis of the baryta salt prepared with this acid, gave the following results : C_{68} H_{66} O_5, Ba O. The acid whose melting point is at 158° Fahr., is, therefore, stearic acid.

The acid which, after crystallizing the stearic acid, remained in the alcoholic solution, preserved after repeated, crystallizations, an invariable melting point at 93.2° Fahr., and displayed all the properties of erucic acid. A baryta salt prepared by it yielded 19.0 per cent. baryta ; the calculation according to the formula, C_{44} H_{41} O_3, Ba O, required 18.8 per cent.—*Ann. der Chem. und Pharm.*, lxix.

COST OF GUN-COTTON.

The expense of the manufacture of gun-cotton amounted, in 1848, according to Maurey, to seven francs per kilogramme (5*s.* 10*d.* for 2lbs. 8oz. troy). The official reports state the cost of mining-powder at 1.17 francs per kilogramme, and that of the first quality of gunpowder at 2.639 francs per kilogramme. In order, therefore, to balance the prices, the gun-cotton should be six times as strong as the first and three times as strong as the latter; but the pendulum test showed only three grammes of cotton equal to five grammes of gunpowder of first quality. With regard to mining-powder, the proportion of gun-cotton was, in blowing up hard stones, as one to five of powder; in softer chalk stones only as one to two.—*Comptes Rendus.*

ADULTERATION OF QUINOIDIN.

The adulteration of quinoidin with asphaltum was lately detected by C. Ohme, in a sample obtained from a respectable house. Externally it perfectly resembled the genuine, but the fracture was much less brilliant, and at the edges it was not quite transparent. By friction a smell of petroleum was developed. By alcohol, and more easily by diluted sulphuric acid, the alkaloid was extracted, leaving a residue of about thirty per cent. of asphaltum.—*Pharmaceutisches Central Blatt.*

EXHALATION OF CARBONIC ACID IN HEALTH AND DISEASE.

In a Memoir read to the Academy of Sciences

BY MM. HERVIER AND ST. LAGER.

Physiological State.—1. The exhalation of carbonic acid varies from hour to hour with the variations of the barometer, having two maxima, at nine in the morning and eleven at night; and two minima, at three in the afternoon and five in the morning. The morning maximum is greater than that of the evening.

2. The variations (the increase?) of temperature and of barometric pressure act inversely in relation to the exhalation of carbonic acid, the former diminishing, the latter increasing it.

3. During digestion less carbon is burned.

4. The use of animal food diminishes, while a diet exclusively of feculents increases, the quantity of carbonic acid.

5. In a rapid race, the expired air ceases to contain carbonic acid.
6. Inspiration of ether and chloroform produces the same effect.
7. The use of alcoholic drinks has the same effect.
8. During sleep less carbonic acid is expired than in the waking state.
9. The air expired by infants contains a larger proportion of carbonic acid than that breathed by adults.

Pathological State.—1. In well-defined phlegmasiæ in general, the exhalation of carbonic acid is increased.

2. In inflammations of the organs of circulation and respiration, however, or in such as tend to impede the action of these organs, this rule is reversed.

3. In the paroxysms of intermittent fever there is an increase of carbonic acid, especially in the last stage.

4. In diseases not accompanied by fever or marasmus, such as chlorosis, diabetes, nervous affections, there is no variation in the expiration of carbonic acid.

5. In the exanthemata, including erysipelas and erythema, there is diminished exhalation of carbonic acid.

6. The same is the case during suppurative process; and also in scurvy, purpura, anæmia, and anasarca.

7. In the last stage of scrofulous, syphilitic, cancerous cachexiæ, and in pulmonary consumption, the exhalation of carbon is likewise diminished.

8. The same thing takes place in typhoid fever, dysentery, and chronic diarrhœa.

In addition to these conclusions, the authors find that the temperature of the expired air does not vary sensibly in the state of health, but that in disease it varies with the number of respirations.—*Gazette des Hôpitaux* and *Edinburgh Monthly Journal.*

THE WEATHER AND THE LEECH.

BY WILLIAM HOOPER ATTREE, ESQ.
Formerly House Surgeon to the Middlesex Hospital.

In Hayley's *Life of Cowper* we find a letter addressed to Lady Hesketh, in which the poet acquaints her ladyship with this interesting fact, at the close of the epistle: "Yesterday it thundered, last night it lightened, and at three this morning I saw the sky as red as a city in flames could have made it. I have a leech in a bottle, that foretells all these prodigies and convulsions of nature. No, not, as you will naturally conjecture, by articulate utterance of oracular notices, but by a variety of gesticulations, which here I have not room to give an account of. Suffice it to say, that no change of the weather surprises him, and that in point of the earliest and most accurate intelligence, he is worth all the barometers in the world. None of them all, indeed, can make the least pretence to foretell thunder—a species of capacity of which he has given the most unequivocal evidence."

Taking these few remarks as my text, you will find the following observations accurate; and if you deem them worthy of a place in your Journal, I shall be obliged to you to have them inserted.

1. If the weather proves serene and beautiful, the leech lies motionless at the bottom of the glass, rolled together in a spiral form.

2. If it rains, either before or after noon, it is found crept up to the top of its lodging, and there it remains until the weather is settled.

3. If we are to have wind, the poor prisoner gallops through its limpid habitation with amazing swiftness, and seldom rests till it begins to blow hard.

4. If a remarkable storm of thunder and rain is to succeed, for some

days before it lodges almost continually without water, and discovers uncommon uneasiness in violent throes and convulsive-like motions.

5. In the frost, as in the clear summer weather, it lies constantly at the bottom; and in snow, as in rainy weather, it pitches its dwelling upon the mouth of the phial.

6. Perhaps it may not be amiss to note, lest any of the curious should try the experiment, that the leech was kept in a common two-ounce phial, about three-fourths filled with water, and covered with a bit of linen rag. In the summer the water is changed once a week, and in the winter once a fortnight. This is a weather-glass which may be purchased at a very trifling expense.

9, *New Cavendish Street*,
June 27th, 1849.

FAMILY POISONING.

The *Devizes and Wiltshire Gazette*, of July 5th, contains the report of an inquest on the body of a child about a month old, whose sudden death, under suspicious circumstances, led to an investigation resulting in an important and revolting disclosure.

Rebecca Smith, the mother of the child, on the 7th of June (five days before the child's death), requested Prudence Mead to accompany her to the shop of Mr. Taylor, for some arsenic, which she said her sister required for poisoning rats. It afterwards transpired that this statement was untrue, as her sister had no rats or mice in the house. Rebecca Smith having previously given birth to ten children, nine of whom had died in their infancy, a suspicion arose in the present case, and an inquest was the result. Mr. Gibbs and Mr. Shorland, who examined the body, detected the presence of arsenic, which was verified by Mr. Herapath. The jury returned a verdict of "Wilful Murder" against Rebecca Smith. The clue thus obtained led to the following discovery, which we quote from the *Times* of July 21st. It is important to observe that the presence of a witness at the time the poison was purchased, was the first clue to the suspicion which resulted in this very important disclosure. The circumstance affords a strong argument in favour of using every possible precaution in the sale of poisons.

DISCOVERY OF POISON IN A BODY AFTER EIGHT YEARS' INTERMENT.

Westbury, Wilts, July 19.

In consequence of the recent inquest here, it was deemed advisable to exhume some of the bodies of the nine other children, who have all died in infancy. Accordingly, on the 11th inst., two bodies were disinterred from the burying-ground of the Baptist chapel at Bratton, in this parish, under the superintendence of Mr. Shorland, surgeon, of Westbury, by whom the remains were taken to Mr. Herapath, of Bristol, for analysation. A coroner's inquest sat on that day, which was adjourned till this day, after taking evidence of the identity of the exhumed bodies.

At the resumed sitting Mr. Shorland described the state in which he forwarded the bodies to Mr. Herapath, after which that gentleman gave the following curious and important evidence:—"On the 12th inst., on my return from Exeter, I found at my laboratory a large square shallow box, on which the cover was sealed down with a crest similar to that on Mr. Shorland's seal. This seal was perfect. The box was divided into three compartments by two divisions, in one of which was a portion of soil tied up in a handkerchief. In the next compartment I found a mass of earth and the remains of a coffin exceedingly decomposed, and penetrated

in all directions by the roots of a tree. There was a label in Mr. Shorland's handwriting on the top of this, to this effect—'Sarah Smith, born July 18, 1841 ; died August 7, 1841 ; aged twenty days.' Upon carefully removing portions of the soil, I found the remains of an infant, evidently very young, as there were no teeth in the sockets of the jaw, with the exception of one tooth-bud on the front of the lower jaw. The texture of the body was entirely gone, and the bones were all separated from each other. I took some of the bones and subjected them to analysis, when I found in them traces of arsenic. I then took some of the black mould from the interior of the skull, and in that I also found traces of arsenic. I then sought for some of the black mould between the ribs and nearer the region of the stomach, and there I found arsenic in greater quantity ; specimens of which I produce." Mr. Herapath then exhibited tubes containing arsenious acid, metallic arsenic, Scheele's green, and orpiment, produced by various tests, and continued :—" This, I believe, is the first instance on record of arsenic being discovered after an interment of eight years ; and I wish it to be circulated throughout the country, that years have no effect in removing traces of arsenic. In the third compartment I found also the remains of an infant, with a label, in Mr. Shorland's handwriting, as follows :—'Edward Smith, born June 14, 1844 ; died June 29, 1844 ; aged fifteen days.' This body and coffin were nearly in the same state as the others; the bones below the knees were wanting. The roots of trees as large as my little finger had passed through the head and skeleton, and had followed the bones in all directions. Treating this skeleton as I did the other, I found arsenic in the bones, in the black mould under the head, and a greater quantity in the black mould under the ribs. I produce specimens of metallic arsenic, and the other tests, which are even more distinct than those in the last case ; this is after an interment of five years and one month."

The Coroner.—From the statement you have made, and from your analysis, have you any doubt that arsenic was administered during life ?

Mr. Herapath.—I have never found arsenic in a body which was in a natural state; and I mention this to correct the ridiculous notions which have gone abroad, owing to some sayings which have been attributed to the French Chemists. Raspail, for instance, is reported to have said that he could produce arsenic from the legs of chairs ; and Orfila, that he could do so from the common soil. I have made experiments on hundreds of bodies of human beings and brutes, but have never discovered arsenic unless it had been administered medicinally or for a criminal purpose. I have also made many experiments on soils, and I believe the statement of Orfila to be a mistaken one. My opinion is, that arsenic was administered to both these children during life, and that it was the cause of death; it existed in too great a quantity to have been administered for a medicinal purpose.

The Jury, without hesitation, returned a verdict " That the deceased children died from the effects of arsenic, but how or by whom administered there is no evidence to show."

BOTANICAL SOCIETY OF LONDON.

Friday, 6th July, 1849; E. Doubleday, Esq., V.P., in the Chair, which was afterwards taken by J. Miers, Esq., V.P., F.R.S.; Mr. G. E. Dennis the Secretary having announced various donations since the last meeting, Mr. Jasper W. Rogers read a paper

" *On the Uses and Properties of Peat Moss, and the Value of Peat Charcoal as a Disinfectant and Fertiliser.* The object of the paper was

to show the useful purposes into which the bogs of Ireland could be converted by the extraction of peat from them for its conversion into charcoal. The charcoal extracted from the Irish peat was far preferable to wood charcoal, and one of its greatest advantages was the effect it had as a disinfecting and deodorising agent. Wood charcoal had not that property to nearly such an extent. It was, therefore, singular that now, when there was so much excitement about sanatory matters, an agent so powerful should have been so much overlooked. It was also valuable as being a powerful absorbent, as it would absorb about eighty per cent. of water, and keep it for the benefit of the soil which might surround it; while it took up the greater portion of the obnoxious gases inherent in night-soil and sewage matter, and thereby did away with any bad effect which might result from them. It therefore was capable of being converted into a manure of the greatest value, the proportions being two-thirds of night-soil to one-third of charcoal. It was impossible to find a better manure for the food of plants; for, containing as it did a large quantity of carbon, it exhaled the ammonia and the salt which were in the night-soil, did not allow them to escape, but treasured them up, and in due time gave them out for the sustenance of the plants placed under its influence. No better agent could be found for improving the sanatory condition of the metropolis. Were a proper system observed, by means of this agent the sewage matter of London could be converted into a source of great profit, while the bad effects arising from the effluvia which emanated from such matter would be got rid of. According to a calculation he had made, the matter so produced by a family of six would, in the course of a year, if subjected to the influence of this agent, yield £30 per annum; and supposing the cost of the charcoal and other expenses to amount to £15, which they could not exceed, there would still be a clear profit of £15 yearly. That might be doubted, but it was a fact which he had ascertained after the most careful consideration; and he had further ascertained, that were all the houses in London which were rented at upwards of £10 to adopt that system, they would earn a profit of £15 per house, or three millions of money per annum. In order to do that, they would have to collect the refuse from all these houses into one great cesspool, and then apply the agent he alluded to; and were that done, it would be the best means of clearing the metropolis of that nuisance which now so much affected the health of its inhabitants; for as matters now were, who could stand for an instant in the vicinity of one of those gratings in the street, without being sensibly affected by the effluvia which proceeded from it? After some illustrations in proof of his statements, Mr. Rogers concluded his paper by stating that he was about to give the public a proof of the truth of his theory, by erecting an establishment for the purpose of carrying it out. He did not see the smallest difficulty there could be in carrying it out in the metropolis. At the present time their ashes were collected for the benefit of the parish in which they respectively resided; and why should they not give up the other refuse matter in like manner to the parish, upon a proper understanding? It was true, no experiment had been as yet made on a large scale in order to test the truth of his theory, but the reason was, that charcoal could not be obtained on a large scale. He had been

requested by the Guardians of the Poor at Macclesfield, some weeks ago, to try the experiment on a nuisance there; and although the charcoal was of a very bad description, the peat having been obtained from a neighbouring moss, it had been eminently successful, and he had no doubt would be so in every case.

Mr. J. Toulmin Smith said, while he did not deny the efficiency of the agent spoken of by Mr. Rogers, he was a strong advocate for the use of liquid manure, as, after long practical experience, he had found it best suited for the purposes of vegetation. On his own premises he had a tank into which the whole of the excrement was conveyed from the house, and which he pumped out and applied for garden purposes in its liquid state, and he had always found it answer well.

Mr. Rogers conceived that Mr. Smith resided in the country.

Mr. T. Smith.—At Highgate.

Mr. Rogers.—Well, your system might do well at Highgate; but how is a man to carry it out in the heart of London? There was no doubt but liquid manure was valuable, but the moment it was pumped out of the tank, and came in contact with the air, that moment the ammonia passed from it and was lost; but when mixed with charcoal, the moment the ammonia came in contact with the charcoal it was fixed, the charcoal acting as a reservoir for it, and giving it out to the plant when it was required.

Mr. T. Smith said, into his tank a large quantity of water was run, and which he conceived was the best agent for mixing the refuse matter; and he thought it would also be the best agent for carrying away the refuse of London.

Mr. Rogers admitted water to be good enough in its way, but when a drop of it fell on one of those particles of charcoal it was retained, and given out as nourishment to vegetation in due time: whereas, if they poured water on the ground, and a bright sunshine were to follow it, it was all absorbed by the atmosphere, and vegetation got no benefit from it.

Mr. Edwin Chadwick said he came there rather to gain information than to make any remarks of his own. He admitted that there were cases where the agent referred to could be applied with propriety, as he had heard of sugar casks being returned to the West Indies filled with manure disinfected by such a process as that to which their attention was now drawn. He did not, however, think that, as regarded London, the system could be brought into practical application. The liquid manure he considered was quite sufficient for agricultural purposes. It was easy of transmission, and was now sent a considerable way into the country at a cheap rate, so that he saw no reason for a change; at the same time, he did not discourage such investigations as the present, as the more facts they could get brought together on so important a subject, the better.

Several other gentlemen spoke upon the subject, alluding to the great interest of the question, when Mr. Rogers sat down amidst much applause.

Thanks were voted to Mr. Rogers for his valuable communication, which was deemed worthy of the most serious consideration of the inhabitants of London.

NOTICES OF BOOKS, &c.

LECTURES ON ELECTRICITY; *comprising Galvanism, Magnetism, Electro-Magnetism, Magneto and Thermo-Electricity and Electro-Physiology.* By HENRY M. NOAD, Lecturer on Chemistry at St. George's Hospital, &c. Third Edition, greatly enlarged. London: George Knight and Sons, Foster Lane.

WE have frequently had occasion to refer correspondents to this work, which gives a very good popular view of the subjects of electricity and magnetism, including their practical applications. The matter is arranged in the form of lectures, having, we believe, originally constituted the substance of a course delivered by the author; and this form is exceedingly well suited to the subjects treated upon, as it affords ample opportunity for the description of the numerous experiments which abound in this department of science. The work is illustrated with nearly 300 woodcuts, explanatory of the forms and arrangements of the apparatus employed; so that those who have had no opportunity of seeing the results demonstrated by experiment, or who, having had their interest excited by that means, may wish to study the subjects more in detail, will find abundant instructions here to enable them to do so. Very extensive alterations and additions were made throughout the work in the preceding edition, and an entire new lecture has been introduced in the present edition, on the subject of Electro-Physiology, comprising a *résumé* of the recently published researches of Matteucci on this subject. Mr. Noad's book affords a sufficiently complete and comprehensive exposition of the subjects on which it treats, for the use of students and amateur cultivators of the science of Electricity; and the easy and familiar style in which it is written is calculated to make it popular among these classes of readers.

BENZOLE: *its Nature and Utility.* By C. BLACHFORD MANSFIELD, M.A. Cantab. 8vo, pp. 47. J. W. Parker, West Strand.

OBSERVATIONS ON LONDON MILK; *shewing its Unhealthy Character, Poisonous Adulterations, &c. &c.; with Suggestions for remedying the Evil.* By H. HODSON RUGG, M.R.C.S. 8vo, pp. 48. Bailey & Moore, Regent St.

OBITUARY.

DR. ANTHONY TODD THOMSON, F.L.S.,

Late Professor of Botany to the Pharmaceutical Society, and Professor of Materia Medica and Medical Jurisprudence in University College.

IT was a subject of congratulation to the Pharmaceutical Society, at the time of its establishment, that this distinguished Professor sanctioned by his presence and assisted by his counsel the early proceedings. Approving of the objects for which the Society was founded, and being enthusiastic in the cultivation of those sciences which form the basis of a Pharmaceutical education, he came forward in the most kind and liberal manner at a time when the infant institution stood most in need of such encouragement. He attended the meetings, contributed original papers, took an active part in the scientific discussions, delivered lectures gratuitously, and lost no

opportunity that presented itself of promoting an undertaking, in the probable success of which even the originators were not sanguine, and which was considered by some members of the Profession to be a project almost chimerical.

Dr. Thomson, with that energy and penetration which characterised him through life, disregarded the obstacles and difficulties; and keeping his eye steadily fixed on the ultimate object, threw his tact and experience into the scale, inspired the founders of the Society with increased confidence, and stimulated them to persevering exertion. The Society is indebted to many professional friends for cordial support and encouragement at that period, but the name of Dr. Thomson stands high on the list of those who may truly be designated as "friends in need," and who may be compared to sheet-anchors in rough weather.

When the School of Pharmacy was founded, Dr. Thomson accepted the office of Professor of Botany, which he retained until the time of his decease. By means of his influence he obtained for the Students the privilege of admission to the gardens of the Royal Botanical Society, in the Regent's Park, where most of the lectures were delivered. In addition to the lectures officially comprised in the course, he voluntarily devoted the intermediate mornings to demonstrations, or peripatetic lectures in the gardens—thus more than doubling the number of lectures, and contributing greatly to their practical utility. This early walk in the gardens he considered a recreation rather than a toil; and nothing appeared to give him greater satisfaction than the appeals of his pupils for information, evidencing their interest in his favourite subject.

For the information of our readers, and in justice to the memory of a Professor to whom the Pharmaceutical Society owes so deep and lasting an obligation, we subjoin a short account of his life. It is extracted from a memoir by a late Student of University College, which was published originally in the *Medical Times*, and quoted in the *Medical Gazette*:—

"The subject of the present memoir was born at Edinburgh, in January, 1778, and consequently, at the time of his death, was in his seventy-second year. His father was a Scotchman, who had emigrated to America, and held the lucrative post of Commissioner of Customs in the town of Savannah, in Georgia. He had arrived on a temporary visit to his native country immediately before Dr. Thomson's birth, but shortly after this event he returned to America, and remained there till the termination of the War of Independence. Dr. Thomson's father, in addition to the Commissionership of Customs, held the appointment of Postmaster-General of the province of Georgia, and was also a member of the Government Council. Like many of the American Loyalists, he threw up his appointments when the peace was proclaimed, and returning to England, received a pension from Government, and retired to Edinburgh. Dr. Thomson was educated in the High School, and subsequently in the College of Edinburgh. Among his school and college friends were Leonard and Francis Horner, Henry Cockburn, afterwards a distinguished orator of the Scottish bar, and now one of the Lords of Session, and several others

whose names have since attained a wide celebrity. At the time of Dr. Thomson's attendance at Edinburgh, the fame of this great medical school was at its height; the names of its teachers, Monro Secundus, Gregory, Black, &c., were known all over the civilised world. Dr. Thomson attended the last course of lectures ever delivered by Dr. Black. During his attendance at College, Dr. Thomson became a member of the Speculative Society, and mingled in the celebrated debates which then exercised the talents of many who were afterwards destined to play no inconsiderable part on a much wider stage. Here it was that Dr. Thomson formed the acquaintance of Lord Brougham, and laid the foundation of a friendship which continued during his whole life. Dr. Thomson graduated at Edinburgh; and having the misfortune to lose his father about this time, and finding that he was left entirely dependent on his own exertions, he determined to commence practice in London; which he accordingly did, after joining the College of Surgeons in London; as a General Practitioner in Sloane Street. He rapidly acquired a large practice, and in 1801 was married to Miss Maxwell, of Dumfries.

"In 1810 he commenced a course of lectures on Medical Botany, which was for many years the only course of the kind in London. It was very popular, and many of the most eminent men of the day became his pupils. Shortly afterwards he published his *Conspectus of the Pharmacopœia*. This little book, the most popular one of its class, was sold to Underwood, the publisher, for £20. Some idea of its astonishing success may be learnt from the fact, that after passing through five editions, the copyright was bought by Messrs. Longman and Co. for £600. It has since passed through many more editions, and has brought immense profit to its proprietors, though very little to its author, who merely received £20 or £30 for revising each edition. In 1811 Dr. Thomson published the *London Dispensatory*,—a work of such merit as at once to command a very extensive circulation, and to place the name of its writer among the first class of medical authors. It has passed through eleven editions, the last being published in 1844. It is a work of great erudition, containing an immense amount of information, admirably put together in an easy and lucid way, and being illustrated with a great number of original experiments and observations. In the Preface to the first edition, the author apologises for its imperfections on the ground that it had not been written amidst the appliances of learned leisure, and the ease of an undisturbed study, but had been composed among the harassing cares and distractions of a most extensive practice. Had such an apology been needed, it might be said that this was most literally the fact, as it was usual for Dr. Thomson to rise at five o'clock in the morning, write for three hours, then spend the whole day in visiting his patients, return to a late dinner, and then work till two o'clock in the morning. Indeed, he never allowed himself more than three or four hours' sleep. In 1814, Dr. Thomson became, with Dr. Burrows and Mr. Royston, one of the editors of the *Medical Repository*. This journal, which speedily commanded a wide circulation, and exercised great influence with the profession, was established both for the purpose of promoting medical science, and with the view of becoming the organ of the associated

Surgeon Apothecaries, who were then agitating for the medical reform which afterwards took the shape of the Apothecaries' Act. Dr. Thomson was one of the most energetic reformers, and embraced the cause of the General Practitioners with his accustomed ardour. It was in great measure owing to his energy, and to the skill with which he and Dr. Burrows advocated the claims of the Apothecaries, that the first instalment of medical reform was obtained for the Profession. Although at this time Dr. Thomson was overwhelmed with a great private practice, he wrote largely for the *Repository*. In the copy which he kept, and which, through the kindness of his family, we have been permitted to inspect, the names of the writers are attached to each article. To those who are curious in such matters, we may now safely permit a glance within the editorial sanctum. The first original article in the Journal, viz., 'Two Cases of Hydrocephalus Acutus,' is by Dr. Thomson, and the symptoms and *post-mortem* appearances are detailed with great minuteness. In the same number is a very able and rather sharp review of the fourth volume of the *Transactions of the College of Physicians*, also from his pen. In the second number, 'The Reviews of the Progress of Chemistry,' 'Materia Medica,' and 'Botany,' on the Continent, are by him; and in the subsequent numbers he wrote the greater part of the Reviews, and of the 'Analyses of Foreign Medical Science and Literature.' Those Analyses were subsequently lengthened into 'Retrospects of Medical Science,' which are perfect models of what such things ought to be, and show to the greatest advantage the singular talent which their writer had of collecting from innumerable sources every important and novel fact. It is astonishing how Dr. Thomson, even with his powers of work, could have found time at this period to fulfil his numerous engagements. He was doing a private practice of about £3000 per annum; he was an active member of the Apothecaries' Committee (and several speeches reported in the first volume of the *Repository*, testify to his exact appreciation of the question of Medical Reform); he was delivering lectures on Botany; and performing an amount of literary labour for the *Repository*, which by itself would have engrossed the whole time of many men. Shortly after this time, the first case of poisoning by oxalic acid in England was published in the *Repository* by Mr. Royston; and Dr. Thomson immediately entered on an investigation into the chemical and medicinal properties of this acid, which ended in the publication of some toxicological papers, to which succeeding writers have continually referred. He discovered also the best antidote to poisoning by oxalic acid, and, in fact, went over the ground which was afterwards trodden in the same way by Orfila. In 1815 and 1816, Dr. Thomson was engaged in numerous inquiries into the microscopic structure of plants, many of which are of great interest, and are contained in his work on *Botany*, published two or three years subsequently. In 1818, the *Medical Repository* was sold to Underwood: Dr. Thomson continued however to be a large contributor to it, and the 'Retrospect of the Progress of Medicine,' which opens the volume for that year, and occupies more than sixty pages, was written by him.

"In 1820, having for some time been a widower, he married a second time.

"In 1826, Dr. Thomson removed from Sloane Street to Hinde Street, Manchester Square, and became a Member of the College of Physicians.

"In 1828, University College, or, as it was then called, the London University, opened its theatres to the public, and Dr. Thomson was elected the Professor of Materia Medica and Therapeutics,—a chair which he held till his death. In the following year he published an edition of *Bateman on Cutaneous Diseases*, with plates. In 1832, on the death of Dr. Gordon Smith, he was appointed Professor of Medical Jurisprudence in University College, in conjunction with Mr. Amos; but shortly afterwards, when Mr. Amos accepted a Judgeship in India, Dr. Thomson became sole Professor, and continued so till his death. During this part of his life, from 1829 to 1849, he continued to manifest the same indefatigable industry as during his career as a General Practitioner. He was Physician to the Dispensary attached to University College, and, subsequently, to University College Hospital. He delivered complete courses of Lectures on Materia Medica and Medical Jurisprudence, and gave weekly Clinical Lectures; he published a great number of scattered papers in the *Lancet*, *Medical Gazette*, *Monthly Journal of Medical Science*, and *Medico-Chirurgical Transactions*, and he contributed numerous articles to the *Cyclopædia of Practical Medicine*. He also published Lectures on Medical Jurisprudence, and the *Elements of Materia Medica*,—a text-book intended for the use of his class, which has passed through three editions. He wrote a very useful work on the Domestic Management of the Sick-room, which had a very large sale; a short treatise on Botany, for the Society for the Diffusion of Useful Knowledge; and published two or three fasciculi of Plates on Skin Diseases.

"In 1841 he commenced a course of Lectures on Botany for the Pharmaceutical Society, and continued them until his last illness. About ten years ago he was elected a Fellow of the College of Physicians,—a distinction which, considering his reputation and his character, might have been sooner bestowed upon him. In addition to his extensive professional avocations, Dr. Thomson found time for various literary pursuits: he wrote many papers for the periodicals of the day—such as Colburn's *Monthly Magazine*, the *Foreign Quarterly Review*, the *Literary Gazette*. He translated Salvert's work on Magic, and edited, with copious notes, the *Seasons* of Thomson. These non-professional pursuits were carried on in what he called his leisure time, which consisted merely of the three or four hours he snatched from sleep, after fourteen or sixteen hours' unremitting application to professional duties. During the last two years of his life he had been engaged in throwing his notes together for the purpose of writing a work on Diseases affecting the Skin,—a task for which his great experience in these affections eminently qualified him.

"In the summer of 1848 both his mind and his body seemed to be as strong and active as ever. He was accustomed to rise at six in the morning, walk up to the Botanical Gardens in the Regent's Park, at seven deliver his Lecture to the students of the Pharmaceutical Society, then return and see patients till half-past twelve. At one o'clock he went to his hospital, and at three lectured on medical juris-

prudence. Once a week, also, he gave a clinical lecture. After his lecture on jurisprudence he made his visits till a late hour in the evening; returned to dinner; and after dinner commenced preparing his lectures for the following day, writing reviews, and medical papers of all kinds, arranging his book on skin diseases, or collecting materials for the next edition of his *Dispensatory*, which was his favourite and most profitable work. After many hours' labour, he would lay aside his professional work and take up some of his lighter pursuits, and then, at two or three in the morning, retire to bed for three or four hours. He found time, somehow or other, to read all the medical publications, both periodical and otherwise, and studied many of them as attentively as if he had been a student of twenty years of age. At the time of his illness he had been very carefully reading Feuchtersleben's *Medical Psychology*, and had half completed a long review of it, intended for one of the leading medical journals.

"In spite of this intense occupation, at the commencement of the session in October, 1848, he had never seemed in better health, or more active in mind. In January, 1849, however, he caught cold, and had a very severe attack of bronchitis: after two or three weeks' illness he went into the country, and soon regaining his strength, insisted, contrary to the advice of his friends, on returning to his work. He entered upon his duties as usual; but, probably from the exposure which a professional man cannot wholly avoid, again suffered a return of bronchitis, with which a little pneumonia was now combined. This was, however, soon subdued, and he left town for a few days to recruit. He came back strong and active, although the cough had not entirely disappeared, and recommenced his lectures and hospital practice. Immediately before the termination of the winter session, he was accidentally exposed to cold, and felt chilled and indisposed: instead of returning home, he went his round of professional engagements; but while engaged in writing a prescription at the house of a patient, was attacked with a fainting fit. He soon recovered, finished his prescription, and returned home. The next day he felt himself too unwell to go out, and when visited by his professional friends, it was found that extensive pneumonia of the right lung had set in. This was apparently soon got under, and at one time he seemed rapidly recovering, and was able to leave his bed for six or eight hours a-day. Without assignable cause, however, the disease again partially returned, pleurisy to a considerable extent complicated the case, and after lingering several weeks in a state of great debility and exhaustion, he gradually sank, and died on the 3rd of July. The mind remained perfectly clear and active till within a few minutes of death; till within a few days, he had continued the dictation of his work on skin diseases, and had consulted authorities on the subject. He bore his illness with extreme patience, and contemplated its inevitable termination with the fortitude of an honest man, and the calmness of a Christian."

TO CORRESPONDENTS.

Oc. Caucrorum.—Emplastrum Plumbi is a soap consisting of oleic and margaric acids in combination with oxide of lead. On boiling the olive oil with litharge, saponification is effected, the oleine and margarine of the oil being resolved into the fatty acids and glycerine, while the former combine with the oxide of lead.

A. Z.—It is asbestos, which is sometimes used for the purpose mentioned.

Amator Veritatis.—Chloric ether and *terchloride of carbon*, are two names which have been applied to the some substance.

Hermes.—We have not heard of a solution of gun-cotton being used for precipitating silver, so as to form mirrors. A patent has recently been taken out for applying a solution of grape sugar to that purpose.

A Member (Bolton)—The analysis of an ointment is often a difficult problem. We are unable to state the composition of that alluded to.

A Registered Apprentice.—Solution of chloride of soda may be made by adding carbonate of soda to solution of chloride of lime as long as a precipitate is formed.

Juvenis.—Ginger beer is sometimes made without fermentation, by charging a sweetened infusion of ginger with carbonic acid, by means of a soda water machine. Effervescing lemonade is also made in a similar manner.

Camber, A.P.S.—(1.) No.—(2.) The "*Solutio Muriatis Morphiæ*" of the Edinburgh Pharmacopœia is intended to be equivalent to laudanum in strength. In such case, of course, as the opium used in making the tincture is subject to variation, the quantity of morphia representing it cannot be precisely estimated.—(3.) Enquiry should be made of the Secretary.

H. P. may obtain the information he requires by addressing a letter to the Secretary, Mr. Smith, 17, Bloomsbury Square.

Amicus.—Ditto. Those who have discontinued their membership may be re-admitted by the Council on payment of arrears and a nominal fine.

S. P. (M.P.S.)—The individual was once a Chemist, but is now an idle profligate adventurer.

A. S. (Birmingham).—Filtration is the best method of clearing essence of lemon when turbid. It may be distilled for some purposes, but the result differs materially from ordinary essence of lemon.

An Original Member.—The suggestions will be attended to as far as is compatible with the wishes of the majority of the readers.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the EDITOR, 338, Oxford Street, before the 20th of the month (if Answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

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THE MEDICAL BILL

Has not made its appearance.

COFFINISM.

The altercations which disturb the harmony of the medical profession in regard to internal discipline, and questions of rank, priority, or technical privilege, afford to cunning empirics an apparent argument in favour of their free trade in physic. The fact that the doctors disagree, is assumed to imply a fallacy in medical science; and on this foundation, with a superstructure of impudence and illogical generalization, any new system, however ridiculous, rises into an ephemeral notoriety, and feeds upon the credulity of the public.

The exploits of Dr. Coffin have assumed a character which seems to demand some animadversion. The extent of his insidious movements is not generally known. Hitherto his name has only come before the public in connexion with inquests on some of his victims, but these isolated cases afford a very imperfect notion of the average result of his practice, as "dead men tell no tales," and the only persons cognisant of the circumstances, are, in most instances, the friends of the deceased, whose faith in the "doctor" has disarmed suspicion.

Enough, however, is known respecting the system now termed Coffinism, to enable us to expose its dangerous tendency, and account for its fatal results. We extract the following observations, and the leading particulars of the last inquest, from the *Carlisle Patriot* of August 11:—

"The movement—for such it is—may likely enough be only in its infancy, judging from the untiring energy with which it is carried on; although far more painful thoughts, suggested by the silent and unobtrusive style in which the Coffinites institute their proceedings, lead to the suspicion that already, in many places, their strange delusions may have gained an extensive possession among the credulous and simple-hearted humbler classes long before the system is apparent. The discovery of its existence seems in each locality only to be made out by the coroner—death, in fact, is the herald of Coffinism. From these remarks, our readers will see that we are not prepared to suggest a remedy—to devise a breakwater to stem the torrent of delusion. Great as were the evils

inflicted on society by the various *nostra* of preceding quacks of pill-notoriety, they are likely to prove trifling in comparison with what our less-educated classes may have to suffer through Coffinism. The chief feature—and a very remarkable one it is—of Coffinism, is the almost total monopoly of it by religious Dissenters of the most zealous castes. The potent, yet uncertain, and therefore treacherous drug, the *Lobelia inflata*, is collected in America, and sent to this country by the sect called Shakers; and the rash and often fatal exhibition of it is, it would appear, chiefly in the hands of the very numerous and untiring body known as Ranters, the Primitive Methodists of our own country. Operating on such materials, Thomson in America, and Coffin here, will find no great difficulty in driving a successful and only a too lucrative trade, by the sale, already to an incredible extent, of their trashy books and dangerous powders—which are only to be procured, in the first instance, from head-quarters. Not only, however, are religion and philanthropy desecrated by the sect in question; science is most ludicrously insulted also. At the trial it was given in evidence that John Wood, a shoemaker, and Storey, a stonemason, were members of 'The Medico-Botanical Society'—of which the *soi-disant Doctor* Coffin is President!"

It appears that Dr. Coffin is not satisfied with dealing out his poisonous vegetable himself; he has established a society of Coffinites, for whose instruction he has published a book, entitled, *A Botanic Guide to Health, and the Natural Pathology of Disease.* He observes in the preface, "An acre of parchment, with a ton of books, and a ship-load of bad Latin, will not even make a shoemaker; what an absurdity then to suppose such things capable of making a physician!" and states, that "every person purchasing this book will have in his possession a diploma that will confer upon its owner more real knowledge than the skill of the faculty can ever bestow." He ridicules the idea of "cutting up a body after death in order to ascertain the nature of the malady of which the patient died. This absurdity" (he says) "is only equalled by that of the philosopher who cut open the bellows in order to see where the wind comes from."

The style of his logic may be appreciated by a notice of the chapter "On the Nature of Disease," in which he defines disease to be "*the loss of animal heat, or a disturbed operation of it;*" and denounces as an absurdity the supposition of the existence of "*fifteen hundred diseases,*" quoting from Dr. Hooper in his *Medical Dictionary*, that "any deviation from the natural and healthy actions of the whole system, or any particular organ, constitutes disease." He then draws a comparison between disease and hunger, which latter "arises from a want of food," and suggests as a parallel "absurdity," the classification of hunger into "fifteen hundred different symptoms, all originating from one common cause, yet to be combated singly." This is followed by a parody on Dr. Hooper's remarks on the characters of various diseases, the word *hunger* being substituted, as in the following specimens:—

HOOPER SAYS:	THE BOOK OF NATURE:
"Disease may be local, affecting only some particular part.	"Hunger may be local, affecting only the stomach, from which particular part the disease is readily expelled by presenting it with a good dinner.
"Or it may be constitutional, affecting the whole system.	"Hunger, if not allayed, will affect the whole system, therefore it becomes constitutional.
"Disease is epidemic, generally diffused among a population, and arising either from contagion, or some atmospheric or other cause, the influence of which is extensively felt.	"Epidemic hunger is unfortunately too often felt by the population of this country, when sickness prevails; the doctors with their weighty bills tend not a little to increase the general distress.
"Disease may be hereditary, descending from the parent to the child."	"The penalties of hunger are too often made hereditary by injustice: when a famishing mother sinks through exhaustion."

The influence of this kind of sophistry on uneducated persons may be easily understood, and its success is demonstrated by the extensive demand for *Lobelia inflata*, which is recommended as the panacea for disease in general, and is sold *ad libitum* to the deluded Coffinites.

At a recent meeting of the Provincial Medical and Surgical Association (Aug 2) a petition to Parliament was adopted, praying for the introduction of a law to place restrictions on the sale of arsenic. If Coffinism should not receive a check from the intervention of the Coroner, it will be advisable to include *Lobelia inflata* in the prohibition. It must be recollected that this drug is administered in doses of sixty grains, by persons whose whole "medical" knowledge is derived from Dr. Coffin's book. In order to disseminate more widely his botanic theory, the Professor has announced a Course of Lectures in the west-end of London, and we are informed that he has taken a house in Russell Square. His operations, however, have been retarded by the recent inquest at Maryport, where his presence was required to watch over the fate of his disciple.

CHARGE OF MANSLAUGHTER AT MARYPORT.*

John Wood (aged twenty-four), a pupil of Dr. Coffin's, was placed in the dock, charged with having committed the crime of manslaughter, by administering to a young man, named Thomas Wilson, a large quantity of *Lobelia inflata*, a very powerful drug, whereby his death was caused.

Mr. Bliss and Mr. Overend appeared for the prosecution, and Mr. Serjeant Wilkins and Mr. James for the prisoner.

Mr. Bliss, in addressing the jury, said, that the deceased, Thomas Wilson, was a young man, of about seventeen years of age, a joiner,

* A few weeks ago an inquest was held in London on a victim of Coffinism. Samuel Thomson, in the United States, has been tried for poisoning by *lobelia*, which circumstance is noticed by Dr. Pereira, in his *Materia Medica*, p. xliii, Historic Table, and vol. ii., p. 1341.

living with his father, of the same trade, and both in the employ of the railway company. He had been labouring under *peritonitis*. On the 12th of April he complained that he was not well, and did not go to his work. On the 13th he was a little better, and went to his work; but on the 14th he again became ill, and went home to his father and mother. The latter gave him a little tea of some kind, and he went to bed and went to sleep. On the morning of the 15th he awoke much worse and in great pain. His father then sent for a person named Story, a blacksmith, and he gave him a little of the decoction of mountain flax. Between four and five o'clock on the same morning the deceased's father, at the request of his son, went for the prisoner, who immediately came and prescribed for him. He ordered an injection, which was composed of a tea-spoonful of *lobelia* (about sixty grains), and an equal quantity of cayenne pepper, and of valerian root, &c. He also ordered an emetic, composed of the same substances, and in the same quantity as he had administered in the injection; and instructed that the deceased was to have a warm bath, and at ten o'clock the same morning he repeated another emetic and injection. The unfortunate young man gradually grew worse; his parents became alarmed, and sent for Dr. Pearson, a regular medical man. The action of the heart was feeble, and he was labouring under congestion of the brain. Another medical man, Mr. Curtis, was also called in, but the state in which the deceased was found was altogether past surgery and past medicine, and he died about half-past four o'clock that day.

Mr. Bliss continued.—It was necessary to the right understanding of the question, that they should have the best information respecting this drug. The learned gentleman then read extracts from works by Dr. Taylor and Dr. Christian, which corroborated what he had advanced respecting *lobelia*, namely, that it was a dangerous drug and a deadly poison. This was the character of the vegetable substance called *lobelia*, among the medical men of this country. They (the jury) would no doubt wonder that the prisoner at the bar should have the confidence to give it to any body; but he (Mr. Bliss) would tell them how that had come to pass. There was in Maryport a *quasi* Botanical Society, which had been instituted by an American named Coffin, who went about the country lecturing and forming what he called Botanical Societies; and, unfortunately, there were persons who followed his prescriptions, out of the use of one of which, he (Mr. Bliss) was sorry to say, the present case had arisen. The learned counsel then drew attention to a book which had been published by Dr. Coffin (as he was called) and observed, that since the death of Wilson, the doctor and his pupils had been endeavouring, by means of lectures and publications, to influence public opinion on the issue of this case. The doctor, who said he had studied at the college of Nature, told them that *lobelia* had long been used by the North American Indians, and could be given without danger and with success in almost every case, whether to the infant or to the aged man; that it never operated upon those in perfect health; and that, when administered, care should be taken to give enough. Never mind the faculty, give enough! He prescribed it for almost all sorts of diseases; for hooping cough, jaundice, and gout, it was *lobelia!* for rheumatism, for cholera and Asiatic cholera, it was *lobelia!* in short, it was *lobelia* for so many diseases that he would not attempt to mention all, lest he should try their patience. He added, that he often invited the faculty to discuss with him, but they seldom dared to meet him; and when they did come in his way, they never stood fire for more than a few minutes. (*Laughter.*) Every man (continued the doctor) would now discharge the duties of physician to his family; and that ere long the trade of the grave-digger would become a much less profitable one; but he (Mr. Bliss) was afraid that so long as there were Coffins in the world there must be grave-diggers. (*Renewed laughter*). The medical men had made several experiments with

lobelia upon inferior animals, with the view of ascertaining the true nature of that drug, and it had proved fatal in all cases. The medical gentlemen had been attacked for the part they had taken in this affair ; but he could assure the jury that those gentlemen had done nothing more than was dictated by feelings of humanity, and a desire for the public safety.

The leading facts of the case having been proved, Dr. Pearson, of Maryport, described the condition in which he found the patient, and the appearances observed on the *post mortem* examination, and stated, "From all the appearances, I concluded that the deceased had suffered from disease of long standing; he had a number of diseases upon him. The appearances also indicated that some substance of an acrid and narcotic nature had been given to him. The disease of long standing was inflammation of the covering of the bowels; it is called *perotinitis.* He also had inflammation of the gullet, stomach, and intestines, and congestion of the lungs and of the brain. From the local inflammation of the stomach and bowels, we drew the conclusion that some irritant poison had been given to him. Narcotic poison would have produced the congestion of the lungs and of the brain. *Lobelia* is, in my opinion, such a poison as would have produced all the appearances which I have described."

Mr. Serjeant Wilkins, in his reply, made a general attack upon the doctors, who, he insinuated, had been concerned in getting up the case, and concluded by an eloquent appeal to the common sense of the jury.

His Lordship briefly summed up, observing, that if the death of the unfortunate young man had been hastened by the administration of *lobelia*, they must find the prisoner guilty; if not, they must acquit him.

The jury, after a short consultation, returned a verdict of Not Guilty.

His Lordship (addressing the prisoner) said—"I would advise you to abstain from giving that medicine at all, as you don't understand it. If you do so again, and any person should die in consequence, you may depend upon it that you will be severely punished."

THE SUBSTITUTION OF ONE MEDICINE FOR ANOTHER.

The text of the Dispensing Chemist is "Prescriptions accurately prepared;" and in the retail department, "Genuine medicines of the best quality," is, or ought to be, the motto. It has occasionally been our duty, and by no means a pleasing one, to direct attention to deviations from these good old maxims, and to point out the serious injury inflicted on the health of the public and on the credit of the trade by the sale of spurious medicines.

Hitherto exposure of the facts has been almost the only check or preventive which could be brought to bear upon such practices. A man who passes a bad shilling, a baker who adulterates his bread, or an adventurer who imitates a signature on a cheque, would immediately on detection be summoned to take his trial; and any person injured by such fraud, who would abstain from prosecuting, would be denounced as neglecting a duty which he owes to the public. But a Chemist may sell a worthless drug, he may dilute or adulterate a preparation, he may sell as the preparation of another that which he has fabricated himself, and his

only source of apprehension is the chance of exposure, and the loss of business which such exposure would entail upon him.

That the law which applies generally to the punishment of fraud is applicable to frauds in medicine, there never was any reason to doubt; but it would appear that difficulties exist in making the law available in this class of offences. At all events, an action at law for the substitution of one medicine for another is a novelty, and the case of Griffiths *v.* Walford is, therefore, one which involves a principle important and interesting to Chemists in general. An admirable report of the case has been widely circulated in the newspapers, and also in the form of a pamphlet, at Wolverhampton. The report is too long for insertion in this Journal; we therefore subjoin a brief statement of the facts.*

On the 1st of April, Mr. Griffiths, of Wolverhampton, being in London, and feeling unwell with a violent irritability of stomach, went into the shop of Messrs Lunn and Walford, of Aldersgate Street, for a dose of Sir James Murray's fluid magnesia. Some conversation ensued between Mr. Griffiths and Mr. Walford, who being a Medical Practitioner as well as Chemist, suggested some other remedy of his own preparation. This, however, was not adopted by Mr. Griffiths, who persevered in his desire to take the medicine for which he had applied. Having swallowed the dose, he exclaimed, "You have given me Epsom salts!" and after some altercation left the shop highly offended. He afterwards called to remonstrate, stating that he had been seriously unwell in consequence of the substitution; but instead of receiving any apology he found that Mr. Walford "took high ground, and seemed to think he had done quite right." Whereupon Mr. Griffiths told him that he would seek reparation in a court of justice, and on the 13th of July the case was tried at the Guildhall County Court, London.

Mr. Griffiths (in the absence of his counsel) conducted the case with much skill, and argued the points in a manner which would have done him credit if he had been an experienced lawyer. He proved that a different compound was substituted for that which he had required; that the compound so substituted had caused serious indisposition, and occasioned his detention in London, and consequent pecuniary loss in his business at home; and he claimed damages, not from mercenary motives, but simply to establish the principle, that "if any one go into a Druggist's shop, and ask for some particular medicine, that Druggist, or Surgeon in attendance in the shop, shall not be at liberty to substitute another, either because he has not got the one asked for, or does not choose to sell it; or desires to sell something else by which he makes a larger profit;

* Printed at the offices of Joseph Bridgen, Darlington Street, Wolverhampton.

or has the vanity or presumption to think he knows better than his customer what is good for him." This is an important principle, and rather comprehensive; but before discussing the principle we must proceed with the case. The Defendant could not deny that the Plaintiff had asked for Murray's fluid magnesia, and admitted that he had given him a solution of sulphate of magnesia and bicarbonate of potash. He thought Mr. Griffiths had asked for his advice. His partner stated that the firm kept Murray's fluid magnesia, but did not sell much of it, as they sold their own preparations, which pay them much better. He admitted that he was neither a Medical Man nor a Member of the Pharmaceutical Society.

Mr. Mellor, counsel for the Defendant, endeavoured to show that the Plaintiff had no case—that he had asked for advice, and that he had not proved any injury to have resulted from the medicine, having, by his own admission, eaten mutton and turnips the day before.

The Plaintiff, in his reply, took occasion to allude to the defective state of the laws respecting Pharmaceutical education in this couutry, and the additional necessity on this account for protecting the public against the evil consequences of careless or fraudulent substitutions. In the present instance the offence was not the result of ignorance nor of accident, the Defendant being a legally qualified Medical Practitioner; and it was inferred that in this capacity he had presumed to deviate from the instructions received in a manner which a Chemist and Druggist would not have felt justified in doing. Mr. Griffiths rebutted the plea that advice was sought or wanted, and rested his claim to a verdict on the facts as above stated.

The jury, after a few minutes' consultation, returned a verdict for the Plaintiff.

With regard to the principle involved in the above trial, the fact is established that the County Courts may be made available for the exposure and punishment of those who culpably substitute one medicine for another. The makers of a spurious compound sold under the name of valerianate of zinc—the fabricators of cod-liver oil by means of oil of almonds or other material—the manufacturers of blue pill containing thirty per cent. of clay, nitrate of silver with half its weight of nitrate of potash or iodide of potassium, diluted with carbonate or chloride—those who sell as the nostrum of another, a compound "of their own preparation, because it pays them better;" in fact, all parties guilty of fraudulent substitution, whether by wholesale, retail, or for exportation, are amenable to the law for thus tampering with the health and confidence of the public.

We shall not go so far as to assert that no circumstances could

justify the substitution of one medicine for another, nor would it be easy to enumerate every possible contingency which might be pleaded in extenuation. We remember the case of a woman who applied for some laudanum. The Chemist, suspecting a criminal intention, gave tincture of rhubarb, watched his customer round the corner, saw her swallow the tincture, and gave her in custody. It may happen that a medicine is ordered which cannot be obtained, or which would require a long time to prepare; the case may be urgent, and a similar preparation at hand which would answer the purpose desired. The substitution might be almost a matter of necessity. The sanction of the customer having been obtained, we are not prepared to condemn the act. Cases of this kind, where the only motive is a desire to benefit the patient, should not be confounded with those in which an inferior or spurious preparation is substituted for the purpose of saving trouble or increasing the profit.

Mr. Griffiths is entitled to the thanks of the public for having led the way in resisting by legal means an abuse which every honest man must desire to see reformed, for although we cannot sympathise with him in his horror of a few grains of sulphate of magnesia, we infer from his triumph on that occasion, that a similar mode of attack might be equally effectual in bringing to justice offenders on a larger scale.

THE SCHOOL OF PHARMACY.

SESSION 1849-50.

THE Lectures in this School will commence as usual in October; and in our next number we intend to offer a few remarks, with the Prospectus of the several courses. In the mean time, we mention the subject in order to remind the students who are now about to recruit their health in the country, that, on their return to town, the lecture-room will present its customary attractions. Recollecting the enthusiasm which prevailed on the occasion of the Pharmaceutical School-Dinner, we hope a similar spirit will stimulate the London Associates when their sincerity is put to the test by the re-opening of the School. We look forward with confidence to a considerable increase in the numbers, a circumstance alike encouraging to the Professors, and satisfactory to all those who feel a sincere interest in the prosperity of the Pharmaceutical Society.

THE LIVERPOOL APOTHECARIES' COMPANY.

A CASUAL observation in reference to this Company, published in our number for July, page 4, has called forth a communication in the form of a reply from the manager, which communication is subjoined:—

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—My attention has been directed to a speech delivered by you to a "Meeting of the Chemists of Liverpool and its vicinity," and published in the *Pharmaceutical Journal* of July last, in which remarks are made upon the Liverpool Apothecaries' Company, over which I have the honour to preside, at once uncalled for, untrue, and libellous. Such remarks, if made by obscure persons, and uttered in such place or such manner as to occasion no echo nor publicity, might have been passed by, as unworthy of a moment's notice. But such is not the case where they are given forth upon the responsibility of a person of character, and published in a wide-spread and influential Journal.

It is impossible for me to judge of the motives which could induce you, a stranger in Liverpool, so gratuitously to malign an Institution with which you are evidently but little acquainted. The objects which brought you here, "to give an account of the proceedings of the Pharmaceutical Society," the aim of which is to promote union and education among Druggists, so as better to fit them to discharge the duties devolving on them, might be deemed to be in exact variance with an attack upon a Company, the establishment of which you would have found, had you thought fit to make proper inquiries, was formed, not on the "pretext" of the inaccuracy of Druggists and the impurity of their drugs, as you have stated, but in consequence of the real absence of that security which the public has a right to expect in the faithful performance of functions upon which the health and the lives of the community are in constant dependence. And here I cannot but remark the exceeding inconsistency, that one, whose errand to Liverpool professes to be to eradicate the very evils complained of, should call that a "pretext," when put forth by the respectable body of Physicians, Surgeons, Merchants, Druggists, and others, who formed the Liverpool Apothecaries' Company, and at one and the same time urge the arguments of that same "pretext" as necessitating the objects of his mission here. You are pleased to say, "However *unfounded* the sweeping charge may have been, it is *impossible to refute it*, because *it could not be denied* that many persons were carrying on business as Chemists (Druggists?) *who had passed through no education*, and that their medicines were in many cases *bad and adulterated*." The logic of your argument may not, upon consideration, be pleasing even to yourself, and it may be difficult to reconcile the "unfounded pretext" with that which it is "impossible to refute, because it cannot be denied." Of this I can assure you: the parties forming the Liverpool Apothecaries' Company made no more "sweeping charge" than you have done in the above sentence, nor did they take pains to make that charge so public and so really "sweeping" as you do; but they chose to find, in their own way, when neither government nor Pharmaceutical Society took any care about the matter, a partial remedy against acknowledged and serious evils. For that purpose, they founded the Institution you attack, and by its various laws and provisions, endeavoured to give as perfect a guarantee to the public, not only of Liverpool, but of all those districts through which its operations might be extended, that neither care nor talent should be spared to secure the perfect purity of drugs, and to make the Institution a provincial standard of comparison. Whatever your opinion may be, Sir, it is not the less certain that the Company has effected its object—that it is acknowledged and held to be such a standard both in Liverpool and elsewhere—that it has supplied to the northern districts of England and Wales, to Scotland, to Ireland, and to foreign nations, drugs that may be relied on, and may be administered with confidence and success; and not only this, but during the thirteen years of its existence, it has been training up in its warehouses, its shops, its laboratories, pharmaceutical and chemical,

under gentlemen of eminent ability, young men who are able to take rank with the most respectable of their trade, thoroughly qualified for their duties, competent to undergo any examination of the Pharmaceutical Society, and who are the most likely men to forward—some of whom already do promote—the very Association and objects you came here to encourage.

I might go much farther in pointing out the inconsistency of your most gratuitous attack. It would be very easy so to do, from your own observations and those of others at the same meeting, and by each monthly issue of the Journal; but it is unnecessary: and I will only point your attention to the indecency (I can call it no less) of such injurious reflections being made in a meeting, the Secretary of which had invited, by circular, the Manager of the Liverpool Apothecaries' Company to attend and assist its deliberations and objects; and on behalf of which the Chemist of the Company, Mr. Waldie, had been solicited to deliver gratuitous lectures; to which he had generously and kindly assented, and whose lectures are advertised in the same number of the Journal in which your speech is to be found.

One subject only remains, and that the most serious, but for which my attention would not, in all probability, have been called to the proceedings of your meeting: you have chosen to speak of the Liverpool Apothecaries' Company as "a concern which, although probably insignificant, and reported to be on its last legs, has nevertheless," &c. This being matter of libel, and not of argument, calculated, if not intended, by its import and wide circulation among the very class of men with whom the dealings of the Company are carried on, to damage the pecuniary interests of the Proprietors, it becomes my duty as Chairman of the Company to call on you for an adequate apology, as public as the injury. If spoken in ignorance, after what I have said above, and when you know that among the founders of the Company were some of the first celebrities of the town—that it commenced with a paid-up capital of above £56,000, that it is the most magnificent and perfect establishment of the kind as to its premises perhaps in the world, that it has now carried on its operations for more than twelve years, you will scarcely upon reflection consider yourself entitled to call the Institution "insignificant;" and when I assure you, having some authority so to do, that it is now more firmly rooted than ever it was, you may perhaps consider yourself yet more grievously in error, and your sense of truth and justice will probably induce you to accede at once to my demand. To refuse, will be deliberately to adopt what may have been maliciously suggested to you, and unthinkingly uttered, and will render necessary a further communication from me.

I am, Sir, your most obedient Servant,

Liverpool, Aug. 11, 1849. JOSEPH ANDERSON.

The remark which has given offence, was intended merely to point out the importance of a regular system of Pharmaceutical education, and a means of distinguishing between qualified and unqualified persons. Our Correspondent (Dr. Anderson) has confirmed the impression under which the subject was introduced, asserting that the founders of the Liverpool Apothecaries' Company "chose to find in their own way, when neither government nor Pharmaceutical Society took any care about the matter, a partial remedy against acknowledged and serious evils." Now, what were these serious evils? Nothing more or less than the want of that education, examination, and reform, which it was the object of the Pharmaceutical Society to introduce. We still maintain, that if the Chemists had been organised, educated, examined, and furnished with diplomas, distinguishing them

from the small fry of ignorant drug-vending hucksters, the proposal to establish a joint-stock monopoly for the purpose of taking the bread out of their mouths would have been stigmatised as a gross injustice. Such a combination—we might almost say conspiracy, designed to undermine the subsistence of a numerous and respectable class of men, stood much in need of an excuse or pretext to justify or extenuate it; and this extenuation was found in the alleged incompetence and irregularities of the Chemists as a body, comprising as it did persons of every degree and position, from the qualified Chemist down to the general dealer, who added a few drugs to his bacon, mousetraps, and et ceteras. Thus the "sweeping charge," although unfounded in regard to some individuals, was applicable to many others; and as no official distinction existed, the whole body, such as it was, could neither refute the allegation nor repel the attack.

We repeat that the subject was mentioned merely as a casual illustration of an argument, and not with any intention to make an unjust attack. The observation that the Institution was supposed to be on its last legs, arose from the information (on what was believed to be good authority) that the shares, originally £10, had fallen to about £3 5*s.*, and that the percentage paid as profit to the shareholders had been very small. The manager having stated that it is "more firmly rooted than ever," we may congratulate the Company on the opportunity thus afforded of publishing the fact, while at the same time we regret the incautious remark which has given offence.

Before dismissing the subject, a brief notice of the origin and constitution of the Association may probably be interesting to some of our readers.

The Liverpool Apothecaries' Company was instituted in 1836, the deed of constitution bearing date the 30th of May of that year. The capital as originally projected was £100,000, in shares of £10 each, a deposit of 2*s.* 6*d.* being paid at the time of subscribing. So long as the shares should continue to be 10,000, no member could be allowed to hold more than 200 nor less than five shares. The deed provides,

"That the business of the said Company shall be, the procuring by importation or otherwise, of drugs, the preparing and compounding of medicines, the manufacturing of chemical and pharmaceutical preparations, and the selling of the same drugs, medicines, and preparations, by wholesale and retail, or either, and generally for the carrying on of the business of wholesale and retail Chemists and Druggists, as also the dealing in all kinds of surgical instruments."

The capital may be increased by raising new shares at any extraordinary general meeting duly convened. The deed also contains provisions for the investment of any surplus fund, the payment of dividends, the remuneration of directors, the return of capital if not wanted, the forfeiture of shares, the winding-up of the concern, and all other matters and things necessary for the management, or contingent on the casualties of prosperity or the reverse.

The originators of the Company were some of the medical practitioners of Liverpool, who enjoyed facilities among their patients for obtaining supporters in the double capacity of shareholders and customers. This opportunity was not thrown away—ladies as well as gentlemen were invited to participate in the benefits of large dividends

and pure drugs; a kind of reciprocity which might be compared to perpetual motion, since the money was destined to circulate from their pockets to the till, and from the till to their pockets, with the regularity of clock-work.

The Hall was built; the bottles and drawers were stocked with drugs "of the purest description,"—the horrors of bad medicines were at an end—it had become a luxury to take physic! So thought, no doubt, the sanguine shareholders of the new Rhubarb Hall, when calculating the probable amount of dividend derivable from the incomes of the two hundred and odd Chemists and Druggists of Liverpool. The concentration of so much "passenger traffic" under the "high-pressure" steam-engine of the medical faculty, driving all the trains into one "terminus," was a consummation devoutly to be wished, and calculated to raise the shares to a high premium. To complete the success of the project, it was deemed advisable to obtain letters patent, for which purpose endeavours were used once in the House of Commons, and twice before the President of the Board of Trade. But, extraordinary to relate, the Chemists of Liverpool were not well satisfied with the part which had been arranged for them to play in the drama—that of quietly resigning their incomes and relinquishing business in favour of the new Company—and they accordingly remonstrated against the proceeding, representing the other side of the question. The result of the investigation was the refusal of the letters patent, on the ground that the proposed corporation was unnecessary; and the Company were obliged to fall back upon their original "high-pressure," the medical faculty and their patients—in other words, the members fell back upon themselves for patronage, having failed in the attempt to secure a complete monopoly.

Twice the Hall has been burnt down. On the second occasion the directors of the insurance company opened their eyes—but paid the money. Probably these casualties may have had the effect of diluting the golden expectations of the projectors of the institution; but we are not aware in what manner the amount of the dividend and the value of the shares were affected by the want of the letters patent and by the combustion of the premises.

In order to place in its true light the nature of this undertaking, we may imagine a Physician (perchance a Fellow of the College) handing a prescription to his patient with this injunction: "Take it to the Apothecaries' Company, otherwise I will not be responsible for the result. At the Hall you will obtain good medicines; but beware of the Chemists, they are not to be depended on." The Chemist, with whom the patient has had an account for many years, being informed of the circumstance, waits on the doctor, and enquires whether any thing has occurred to lessen the confidence hitherto reposed in his establishment; expressing surprise that a Physician who has for many years recommended him solely on the ground of his attention to business and the purity of his drugs, should suddenly turn round and forbid his patients to enter the shop. The doctor replies that he has no charge to make against him specifically, but he *prefers* the Apothecaries' Company; adding, that some Druggists are not so particular as they ought to be in the quality of their medicines. The argument, although a *non sequitur*, admits of no reply—it amounts to this, "Be-

cause A. B. is not to be depended upon, the patient is not to go to C. D, where he has hitherto been well served, but he is to go to *my shop*, where I (M.D.) shall obtain a slice of the profit from the prescription, in addition to the fee which I have just put in my pocket." We may instance a Physician in London, who adopts the same principle on a small scale. He is in reciprocity with a Chemist, who is in fact his assistant or cat's-paw; and as he generally writes his prescriptions in such a manner that no other person can understand them, the patient is obliged to go to that particular shop for the medicine. The doctor himself being prohibited by the laws of the College from being in any way connected with the practice of Pharmacy, this arrangement is carried on *sub rosa*, and would never come to light if all the patients would obey orders. But sometimes a patient chooses to go to his own Chemist, and thus furnishes a clue to the discovery of the plot.

Whether it be professional, fair, or respectable, for medical practitioners to connect themselves *sub rosa* with a small shop, or openly to become partners in a large one—in either case using their professional authority in the capacity of touters to increase the dividend—is a question which we merely throw out for the consideration of our readers. It is not our object to enter into any controversy with speculators of this description, but simply to urge our brethren to unite heart and soul in the endeavour to raise the qualifications of our own body, and thus to remove the only *pretext* which could possibly be used in extenuation of a joint stock medical monopoly, which, in the absence of such pretext, would be scouted as a disreputable act of injustice, a violation of the good old maxim, "Live and let live."

We have gone more minutely into the subject than we had intended, in consequence of Dr. Anderson's letter, which appeared to require some explanatory remarks.

MODE OF ESTIMATING THE VALUE OF A CHEMIST'S BUSINESS.

When the business of a Chemist and Druggist is offered for sale it is not uncommon to estimate the good-will at two years' *net profits*, the stock and fixtures being taken at a valuation. The stock is usually valued at about twenty or thirty per cent. under prime cost, and the fixtures at a considerably larger reduction, according to their condition. The lease, if the premises be beneficially held, is estimated in the usual way, according to the length of the term.

Of course this method of calculation is liable to various exceptions, depending on the nature of the business, the peculiarities of situation, the facilities afforded for the introduction of the purchaser to the connexion, &c. &c. A business consisting chiefly of "dispensing" would be worth considerably more than one in which "general trade" formed a large item; and a business of some notoriety would be worth more in proportion to its returns than one recently established or little known. The temporary personal attention of the vendor for the purpose of introduction gives additional value to the good-will.

The compulsory sale of a Chemist's premises to a railway company is altogether a different transaction. In that case the vendor has a

right to expect a full price for his fixtures, inasmuch as he is obliged to replace them, and he should be fully indemnified for any possible loss in his stock. He does not, strictly speaking, sell the good-will, as he is at liberty to transfer his business to the nearest house which he can obtain; but he is entitled to ample compensation for the loss of trade which he must inevitably sustain during the process of moving, and also for the chance of losing some of his connexion by the change of situation. It more often happens that such changes are ultimately beneficial; but this is a hazard, and being an unwilling vendor, he is entitled to the benefit of a doubt, besides the additional compensation sanctioned by Act of Parliament as the price of compulsion in such cases.

We take the opportunity of alluding to this subject on account of the case of Mr. Bird, of Worcester Street, Birmingham, reported in the *Birmingham Journal* of August 11th, whose premises were required by the Railway Company. The case was tried before a special jury, and the following is the analysis of the claim extracted from the speech of Mr. Serjeant Allen, counsel for the claimant:—

His rent under the lease was £70 per annum; but so commodious were the premises that he could not obtain others suitable for his business for less than £150 a year, with additional proportional taxation, amounting to an actual rental of £206 a year. They made the loss of the lease, with a reduction for present payment, to amount to £900. The second source of loss which they would have to assess was the destruction of Druggists' fixtures. Mr. Bird had expended no less than £600 in the fitting-up of his house and premises; and the jury could easily conceive the small amount such articles would sell for when torn from the places in which they were placed. He was informed they would not realise twenty per cent. of their cost to the seller. He (claimant), then, on this score, claimed £400 for loss upon fixtures. He came next to the destruction of trade. The business carried on by Mr. Bird was peculiar, and attached to a particular locality. If a person removed the trade of a Druggist from a particular locality, his connexions, when his business was retail, would not follow him. He (Serjeant A.) should prove, without doubt, that the profits of Mr. Bird's trade amounted to about £800 a year. He was the manufacturer of several popular drugs. Now he believed that three years' profits would be deemed not more than a sufficient compensation for loss of trade—that would make on this head £2400. But this was not all. It must be recollected that the Company took possession of this property contrary to the will of the claimant, and they therefore added fifty per cent. for forced sale, which would make the claim for loss of trade £3600. On the subject of compulsory sales, he might be allowed to say that if fifty per cent. was allowed for land, it was assuredly much more warranted when the property taken was the trade by which the claimant and his family were maintained and subsisted. The last claim they made was for the forced sale of the stock. The actual loss to Mr. Bird, by the sudden sale by auction of the £700 worth of drugs now in possession, would, it was estimated, be eighty per cent., or £550. Thus the total claim which Mr. Bird made against the Company was £5300.

Mr. Wright, accountant, deposed that he had examined the claimant's books, and from them proved, by purchases, stock, and receipts, that the trade of Mr. Bird was in value about from £1400 to £1500 a-year. In 1848, when the profits of Mr. Bird were stated to be £750, the only payments he made for Assessed and Income Tax were, in May, £2 14*s.* 4*d.*;

March, £5 4*s.* 7*d.* ; and November, £5 3*s.* 4*d.* ; total, £13 6*s.* 3*d.* The Income Tax alone, at 7*d.* in the pound, would have been £21 17*s.* 3*d.*

On cross-examination by Mr. Talbot, witness stated that Mr. Bird never made any income return, but allowed himself to be assessed by the Government Assessor.

Mr. Henry Sansum, house agent, deposed that he had been employed to search for a house suitable for Mr. Bird and his business. He had looked out for nine weeks, and he could not find one. A shop of the description occupied by Mr. Bird could not be had for less than £150 per annum.

Mr. Talbot, on behalf of the Company, in addressing the jury, said, so far from the Company wishing to turn Mr. Bird out of his premises, they were willing to allow him to remain until his premises were required. It was in evidence, however, that so far from the Railway Company having done the claimant any injury, his business had been gradually increasing up to the present time. He also argued that the premises were held under an agreement for lease, which he contended was not binding on the landlord.

The jury retired for a considerable time, when Mr. Blyth entered the Court, and stated that there was no probability of an agreement.

A consultation of counsel took place, when it was agreed that rather than the jury should be locked up, they would assent to their discharge.

After conferences with the Under-Sheriff and Assessor, the jury again retired, and ultimately found a verdict for £985, and 1*s.* damages. The claim was for £5300 ; the Company had offered £1250.

Assuming the leading facts of the case to be as stated, we think the claimant was underpaid. His claim on the other hand was calculated rather to prejudice his case by its magnitude, more especially after his ready acquiescence in the assessment of the Income Tax commissioners. Probably he was not aware at that time what his income actually was. " Where ignorance is bliss 'tis folly to be wise."

THE CHOLERA.

The increasing prevalence of the Cholera in all directions, has afforded to the medical profession generally the opportunity of putting to the test the various theoretical views which had previously been under discussion. In the medical journals we find reports of cases, with a full description of the modes of treatment adopted in the London hospitals and elsewhere. We are informed that the College of Physicians has also continued the investigation of the subject, having a standing Committee appointed to collect and arrange evidence from all sources, with a view of arriving at some practical deductions valuable to medical science. The South London Medical Society has also held a meeting with a similar object.*

Hitherto no positive conclusions have resulted from the inquiry. The disorder assumes different forms, according to the degree of severity and local circumstances. The idea of discovering a specific is Utopian and irrational, the experience of the profession having shown that modes of treatment opposed in principle to each other have been attended with a similar relative amount of success. All

* Held at the Literary Institution, Southwark, August 17 : see *Medical Gazette* of August 24, and *Lancet* of August 25.

that can be done, is to attempt a classification of the degrees or varieties of the disorder, and combat the several symptoms as they occur, on general principles. When the epidemic is prevailing, as it has done during the past month, it is impossible for the medical profession to give immediate attention to each case as it occurs; it is therefore desirable that some information should be conveyed in a popular form for the guidance of persons suddenly attacked with the premonitory symptoms. On this ground we advert briefly to a branch of the subject which otherwise we should have considered out of our province.

Among the recent suggestions, we may mention the internal administration of olive oil, in doses of an ounce or more; also tannin, in doses of five grains, combined with three grains of calomel. The value of these modes of treatment has not been established. Acetate of lead and opium, followed by tincture of rhubarb and decoction of bark, also calomel and opium followed by tincture of kino and catechu, have been found useful in some cases. Chloroform has been found to give temporary relief, succeeded by a debilitating effect. Some practitioners recommend dry toast and rice-water as a specific! Others have tried, in the several stages of the disorder, the following remedies:—Nitrate of silver, bichloride of mercury, arsenic, sulphate of zinc, chlorate of potash, carbonate of soda, ammonia, catechu, mustard, and turpentine. The wet sheet and the vapour bath have their respective advocates, while hot air is generally discarded. The following has also been recommended: tincture of matico as strong as it can be made, from ʒij to ℥ss; tinct. opium, ʒss to ʒj; sp. camphor, ♏xv to xx; water, ℥ss. A fourth to be taken when the sickness and purging come on. Dr. Granville has described the Russian treatment, which consists of a hot vapour bath of a peculiar construction, followed by friction and the internal administration of a vegetable stimulant called "samboul," which is described as "a mass of roots and leaves of a greenish plant, bruised and pressed together, strongly bitter, and at the same time aromatic and exciting, the diffused impression continuing long on the tongue and throughout the mouth†."

A distinction should always be made between true Asiatic Cholera and the diarrhœa or dysentery which precedes or accompanies it. For want of this distinction, very little reliance can be placed on the official statistics in reference to the per-centage of deaths as compared to the number of cases. Some practitioners only report the deaths, others only the worst cases, others include all cases coming under the general definition. Hence we are told in some localities that the mortality is fifty per cent. or more, in others only five per cent.; the per-centage depending, not on the comparative degree of mortality in the sense implied, but on the number of cases of simple diarrhœa included in the return. In the worst cases, diarrhœa is frequently absent, and the rapidity of the disorder appears to defy all remedial measures.

The diarrhœa, which is said to be the usual premonitory symptom, is, in a large majority of cases, relieved by simple means; it is this form of the disorder which is adapted for popular treatment, and which in fact demands the attention of all persons who have families, or who are concerned in the relief of the poorer classes. At Wands-

† See *Med. Gazette*, Aug. 17, p. 286; also *Phar. Journ.* vol. vii., p. 475.

worth, where the epidemic has been fearfully prevalent, some of the inhabitants established a depôt for furnishing medicine gratuitously. On the first appearance of diarrhœa, a tea-spoonful of a powder, consisting of four parts of magnesia, two of rhubarb, and one of ginger, was given with ten drops of essence of peppermint in a little water. In some cases, the dose was repeated in two or three hours. This was sometimes followed by a more cordial medicine, consisting of aromatic confection, sp. salvolatile, carbonate of soda, rhubarb, comp. tincture of cardamoms, and pimento water. When the diarrhœa proved obstinate, a scruple of confection of opium was given. It must be admitted that this kind of treatment is safe, and the result proves that it was useful, only two deaths having occurred during three weeks among upwards of 1500 cases. When the symptoms failed to yield to the above remedies, medical aid was procured as soon as possible; but this was often difficult, on account of the great pressure of sickness at the time. The severe cases of actual Cholera, not included in the above statement, were attended entirely by the medical practitioners; the object of the popular treatment being merely to arrest the premonitory symptoms in cases where medical aid could not be immediately had; and the success of the remedies caused an increased demand in that quarter.

Twenty-three deaths occurred within a few days in Albion Terrace, Wandsworth Road. Among these were the whole family and establishment of Mr. Harrison, except one servant. Mr. Harrison having lost all his family, removed to Hampstead, where he was attacked on the following day, and died in a few hours. At the inquest on his body the jury returned the following verdict:—"That the deceased died of Asiatic cholera, and that the disease broke out only in one place where the drainage was very defective; also that a large quantity of filth was allowed to accumulate at one or more of the houses; also that the tanks and the water in them were impure from their close proximity to the cesspools."

Several medical practitioners have fallen victims to the epidemic, among whom are Mr. Aston Key, who died after an illness of a few hours, and Mr. Beale, one of the city medical officers.

In consequence of the supposed necessity to bury persons who have died of cholera within twenty-four hours, several premature interments have been reported, in which the fact that life was not extinct was discovered just in time to prevent the completion of the ceremony. The spasmodic contraction of the muscles, which takes place after death in cholera patients, has led to the unfounded rumours in other cases that premature interment had taken place.

The Board of Health has issued its fifth notification, in which the severity of the epidemic is attributed, in great measure, to the imperfect manner in which the previous instructions of that Board have been carried into effect. In addition to the usual routine of sanitary measures which are recapitulated, the Board especially recommend house-to-house visitation, by which means alone they consider that the disease can be effectually detected and arrested. The appointment of additional medical officers is also suggested, with this important recommendation, "That the remuneration of these officers should be more proportionate to the value of their required services."

The cholera has prevailed in its worst form in the neighbourhood of St. Helen's, Bishopsgate Street. It is stated that in Bishopsgate churchyard it is the practice to bury paupers in a large hole, in which the coffins are placed in succession until the hole is full, about fifteen or twenty being buried in one hole, which is filled in the course of a fortnight from the commencement. When full the funeral service is performed, and a layer of earth spread over the top. A correspondent in the *Times* of August 25th, describes this practice as affording a means of accounting for the prevalence of the cholera in the vicinity. In many cases it is impossible to trace the disorder to any such source, as the epidemic has become general, being confined to no particular locality, but making its appearance among persons of all classes, frequently without any assignable cause.

In the parish of Marylebone the cholera has not been so prevalent as in some other places. The parish authorities have adopted such measures as appeared requisite to meet any probable emergency. This, however, has not been sufficient to satisfy the Board of Health, whose interference has been rather extraordinary. Dr. Milroy having been deputed by that Board to visit the workhouse and make a general inspection of the parish, forwarded to the Board of Guardians a communication recommending, by the authority of the Board of Health, "That two additional medical men be for the present engaged to attend exclusively upon the poor affected with the prevailing epidemic, and THAT THESE GENTLEMEN SHOULD TAKE UP THEIR RESIDENCE IN THE TWO MOST UNHEALTHY DISTRICTS OF THE PARISH, the one in Lisson Grove, and the other in the immediate neighbourhood of Gee's Court, Barratt's Buildings, &c., both being provided with medicines ready prepared for immediate dispensing; also that a house or building suitable as a place of refuge should be immediately provided." The Board of Guardians acknowledged the receipt of the communication, stating, in general terms, that they had taken the requisite precautions, and were prepared to carry out any measures which circumstances might require. This, apparently, was considered not sufficiently submissive and obedient; accordingly, on the 25th of August, the following communication was received by the Board of Guardians:—

"To the Members of the Select Vestry of the Parish of St. Marylebone, and to all others whom it may concern.

"Whereas by the Act 11th and 12th Vict. cap. 123, intituled 'An Act of the Tenth Year of Her present Majesty for the more speedy Removal of certain Nuisances, and the Prevention of Contagious and Epidemic Diseases," and by virtue of an Order of Her Majesty's most honourable Privy Council, bearing date the 27th day of March, 1849, directing that the provisions of the said Act be continued in force throughout the whole of Great Britain: We, the General Board of Health, are authorised to issue such directions and regulations as the Board shall think fit for the prevention, as far as possible, or mitigation of epidemic, endemic, and contagious diseases.

"And whereas the parish of St. Marylebone appears to be affected by formidable epidemic and endemic disease,

"We, the General Board of Health, do, in further exercise of the power vested in us as aforesaid, issue the directions and regulations hereinafter contained to extend to the Parish of St. Marylebone.

"1st. That two legally qualified medical men be forthwith appointed in

addition to those already appointed in the parish to aid in carrying out the system of house-to-house visitation, or any other measures that it may be deemed advisable to adopt under the emergency.

"2d. That a suitable house or place of refuge be forthwith provided for the reception of the families of those necessitous persons who have been attacked by Cholera, and of those necessitous persons being under the same roof, or within the immediate vicinity of persons so attacked, and also for the reception of those who may have been removed from over-crowded dwellings, where disease may have already made its appearance.

"3d. We hereby order the clerk to the said select vestry to take steps for summoning a meeting of the vestry forthwith.

"4th. And we further order the said clerk to read this order at the said meeting.

"5th. And we further order that the vestrymen assembled at the said meeting do carry into immediate effect the provisions of this order.

"6th. And we further order the said clerk to transmit forthwith to us a copy of the minute of the said meeting, together with a list of the names of the vestrymen present at and of those absent from the said meeting.

"Given under our hands, and under the seal of the General Board of Health, this Twenty-third day of August, One Thousand Eight Hundred and Forty-nine.

"Ashley,
"Edwin Chadwick,
"T. Southwood Smith."

We publish the document entire, as a curious specimen of the tone assumed by the dictators, who pretend to instruct the parish authorities in the manner in which they are to perform their duties. They address the letter to the "*Select Vestry*," and send it to the *Board of Guardians*, as if they intended that "between two stools" it should fall to the ground. However, the document was dealt with by both Boards, and the nature of the requisition exhibited in its true light during the discussion. There can be no objection to the appointment of additional medical officers, whether necessary or not; but with respect to the "house-to-house visitation," Dr. Allen, the resident Physician at the workhouse, gave a practical opinion, in which we fully concur. He thought the facilities for obtaining gratuitous medical advice were already quite sufficient, as any person could obtain a medical order for self or family on application. If medical advice be not worth asking for it is not worth having. He also thought the house-to-house visitation would be attended with little or no benefit, unless accompanied with a supply of nourishing food; and even in this case it would be calculated to destroy that self-dependence and responsibility, which, especially among the poorer classes, is of great importance as a safeguard; and that it was likely to create a panic, which would inundate the workhouse with imaginary invalids, and tend rather to aggravate the evil than produce any benefit. The idea of issuing a general order for the removal of the families of persons attacked by cholera, and their neighbours, to a temporary asylum, is an extraordinary proposition. Those who are acquainted with the state of the population in the courts and alleys of the parish, must be aware that such a scheme is impracticable, and characteristic of the visionary imaginations of Mr. Chadwick and Dr. Southwood Smith.

Persons issuing orders of this description should make themselves acquainted with all the circumstances of the locality. That such dictation comes with a bad grace from the two gentlemen above named will

appear from the subjoined account of their proceedings in the capacity of Commissioners of Sewers. With every desire to pay respect to the Government, and to functionaries acting under that high authority, we cannot overlook the inconsistencies of individuals, which reflect discredit ont he source whence they derive their appointment, and reluctantly concur in the following sentiment, quoted from the *Lancet* of Aug. 24—"It will be well, indeed, among its thousands of slain, if cholera should overturn the Board of Health—not that cholera should seize its individual members, but that the public mind should be so enlightened as to their impotency for all sound salutary measures as to render its collective existence for the future altogether impossible."

ROTTENNESS IN THE METROPOLITAN COMMISSION OF SEWERS.

While the Cholera is prevailing to an alarming extent, and sanitary measures are the order of the day, the Commissioners of Sewers are wasting their time and the public money in party squabbles and puerile experiments. The streets are polluted with the offensive effluvium issuing from the gratings, the result of the new system of flushing noticed in our last number, by means of which the accumulations of filth are stirred up, and their latent corruption rendered sensible and sent forth. Those who complain of this intolerable nuisance opposite their houses, are told by the Commissioners that they may have the gratings trapped if they will pay the expense. Some have submitted to the imposition, and the outlet being cut off in these places, the stench is increased in others by concentration. Those who object on principle to such arbitrary and unjust proceedings, must endure the evil. The public, who are taxed heavily enough by this extravagant Commission, are thus placed between these two evils —they must either submit to a robbery, or live in the atmosphere of a plague. Some idea may be formed of the jobbing and trickery which prevail in the Temple of Cloacina in Greek Street, by the following extraordinary requisition to a special meeting, and the result:

METROPOLITAN COURT OF SEWERS.

A special meeting of the Court was appointed to be held yesterday, in pursuance of the following requisition, the terms of which will sufficiently explain themselves:—

"We, the undersigned, request you, as secretary to the Metropolitan Commission of Sewers, to summon a special Court of Sewers, to be held at the principal office, No. 1, Greek Street, Soho Square, on Tuesday, the 21st day of August, inst., at 10 o'clock in the forenoon, for the purposes of ascertaining, from documentary and other evidence, whether there be any truth in the statements made by Mr. Chadwick at the public Court of Sewers on the 2d inst., against the undersigned Commissioners, for obstructing and misrepresenting 'the very large economy' resulting from the present system of 'contract' for removing by flushing of the soil from the sewers at a cost of '6*d.* per cubic yard;' the removal of soil under the old Westminster Commission, the cost was 7*s.* per cubic yard; and the undersigned were approving members of such expenditure in that Commission, thus exhibiting an alleged 'large economy' in favour of the present system of 6*s.* 6*d.* per cubic yard, being a difference of 1,300 per cent.

"To ascertain the exact amount in thousands of pounds, of the money of the rate-payers already expended in the flushing department, entirely omitted by Mr. Chadwick in his statement of the 'very large economy'

of the present system of flushing the sewers by 'contract;' and to ascertain what in reality such 'contract' is.

"To ascertain from the account-book of assistant-surveyor Lovick (to whom, on the recommendation of 'the Committee of Works,' the flushing department has been for many months exclusively entrusted), whether, during the thirty-one weeks of the present year to the 31st of July, the 'yards lineal' of sewers flushed out in the Surrey and Kent districts do not make a total of 214½ miles, at a cost to the rate-payers of £10 6*s.* 4*d.* per mile, independently of the district portions of the very large omissions of expenditure by Mr. Chadwick in his statement on the 2d inst.

"To ascertain if, beyond these omissions by Mr. Chadwick, and beyond the £10 6*s.* 4*d.* per mile shown in the account-book of assistant-surveyor Lovick, the rate-payers of the Surrey and Kent districts have not been charged, in the account of the contractor with the court for those districts, Mr. Dethick, other large items of expense connected with flushing, among which are 2,400 loads of soil carted away at 2*s.* 6*d.* per load for cartage only.

"To ascertain the number of times the same length of sewer has been flushed out in the thirty-one weeks, each time of such flushing costing the rate-payers on the general average at the rate of £10 6*s.* 4*d.* per mile.

"To ascertain if any of the sewers in any district are flushed out three times a week.

"To investigate the 'special contracts' at per 'yard lineal,' entered into by assistant-surveyor Lovick and the labourers; and to ascertain if any of the sewers under such arrangements have had the soil washed into the adjoining sewers, at an expense to the rate-payers equal to 3*s.* per cubic yard.

"And to take such immediate steps as the result of the evidence to be submitted at such special court may render necessary for the honour, character, and usefulness of the Metropolitan Commission of Sewers, and the best interests of the metropolitan rate-payers confided to the guardianship of the Commission. Dated this 16th day of August, 1849.

"JOHN LESLIE.
"FREDERICK BYNG.
"JOHN BIDWELL.

"To E. H. Woolrych, Esq., Secretary,
"Metropolitan Commission of Sewers."

By the 19th clause of the Metropolitan Sewers Act (11 and 12 Victoria, c. 112) it is provided, that "if there shall not be six Commissioners present within an hour after the time appointed for holding a Court of Sewers, it shall be lawful for the Commissioners present, or the major part of them, or any one Commissioner, if only one be present, or for the clerk, if no Commissioner be present, to adjourn such court." At 11 o'clock, only four Commissioners were present in court yesterday—viz., Sir John Burgoyne, Mr. Leslie, Mr. Bidwell, and Mr. Hume, M P.

Mr. Chadwick with his party met in an adjoining apartment, determined not to assist their fellow-commissioners by their presence; but if a court should be formed without them, then to go in and swamp the other party by force of numbers. Every precaution was taken. A beadle was constituted the Lord Marcus Hill of the transaction. His office was to stand at the board-room door and give notice to the in-coming members that their presence was required elsewhere. To one member, who had made his way into the board-room despite of the solicitations of the beadle, a slip of paper was sent, and he instantly withdrew. The special meeting was therefore adjourned until Wednesday, the 29th of August. It was understood that the following Commissioners, though not present, were in the adjoining room: Mr. Edwin Chadwick, Dr. Southwood Smith, Mr. Alexander Bain, Sir Henry de la Beche, Mr. Cuthbert Johnson, Mr. Thomas Banfield, Mr. Joseph Hodgson, and Mr. Thomas Hawes.

We were also informed that the Hon. Frederick Byng, one of the requisitionists, and Mr. Walter, M.P,. were absent from indisposition.—*Times.*

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The nineteenth meeting of this Association will be held in Birmingham, commencing on Wednesday, the 12th of September, when the general committee will meet for the election of sectional officers. The committee of sections will meet daily, from Thursday, the 13th of September, to Wednesday, the 19th, inclusive, at 10 a.m. The sections will also meet daily, at 11 a.m.

Arrangements have been made as usual for excursions, geological, zoological, and mechanical, in the neighbourhood of Birmingham, a locality rich in objects of interest, especially in relation to the application of science to the arts. Judging from the spirit with which these arrangements were conducted on the last occasion at Birmingham, there is every reason to anticipate a good meeting.

THE MEDICINE STAMP ACTS—ANOTHER CAUTION.

The prosecutions under the Medicine Stamp Acts having been less frequent since the provisions of the Acts have been minutely explained, the informers have contrived a fresh mode of attack, in order to keep up the excitement, and furnish themselves with occupation. Hitherto the informations have had reference to the sale of medicines without stamps, when stamps were required. The present line of attack relates to the manner in which the stamp is pasted on. By the 52 Geo. III. c. 150, s. 2, it is provided, that the label shall be affixed in such a manner that the packet, &c., cannot be opened and the contents poured out or taken therefrom without destroying the stamp; the penalty being incurred if the medicine be sold with the stamp affixed in any other manner (see vol. viii, page 154.)

On the 21st of August, a writ was issued against Mr. Cooper of 25, Oxford Street, "for selling on the 7th instant, an article of patent medicine (cough lozenges) without the stamp duty label being *properly* affixed."

On inquiry, it appeared that the hinge of the card-box had been *cut*, and the lozenges abstracted behind. The stamp which was pasted in front of the box then became a hinge, by means of which the box might be opened about a quarter of an inch, so as to abstract the lozenges without destroying the stamp! This proceeding on the part of the informer is so exactly like that adopted by the light-fingered gentry for cutting a purse out of a person's pocket, that it becomes a matter of speculation where the said individual acquired his education and experience. On hearing the case, we were quite sure that the Board would not sanction such conduct, and have no doubt that the penalty will be remitted. At the time of going to press the answer had not been received.

Care should be taken to examine every package when stamped, in order to guard against similar annoyance.

THE PATENT MEDICINE LICENCE.

Becomes due on the 1st of September.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS, ASSOCIATES AND APPRENTICES (*continued*).

Elected in July and August.

MEMBERS.

Birmingham	Bagnall, Thomas
Chelmsford	*Seaton, George
Gateshead	Greenwell, William C.
Harrow	Bowen, Henry F.
Hatcham	Hill, Lawrence
London	Cocksedge, Henry B.
	*Ellis, George H.
	Ellis, William
	Stead, John M.
Wednesbury	Stevens, John
Whittlesea	Cory, Robert C.
Witney	Fox, Charles James
York	*Linsley, Thomas

MAJOR EXAMINATIONS.

Chaplin, John Lambert	338, Oxford Street
Dymond, George	Exeter
Greenwell, Baker	338, Oxford Street
Hepple, Henry	Bideford
Kirby, Samuel Amos	Gosport
Murdoch, James	Glasgow
Quiller, Charles Rowett	Helston
Ringrose, Blanshard	Leeds

MINOR EXAMINATIONS.

Farrer, John Downing	Great Yarmouth
Francis, Henry	338, Oxford Street
Row, Frederick	Great Yarmouth

REGISTERED APPRENTICES.

APPRENTICES.	RESIDING WITH	TOWNS.
Cumpsty, George	Mr. Warburton	Bolton
Dale, John	Mr. Reinhardt	Leeds
Gowing, James J. W.	Mr. Steward	Great Yarmouth
Hallett, John W. R.	Mr. Hallett	Plymouth
Mackinson, Daniel	Mr. Warburton	Bolton
Martin, George M.	Mr. Rouse	Southwark
Mellor, Richard J.	Mr. Wylde	Manchester
Overton, George	Mr. Roberts	Bourne
Ryley, Henry B.	Mr. Fowke	Stafford
Souter, John C.	Mr. Dowell	Birmingham
Tootill, John B.	Mr. Barlow	Manchester
Willey, Josiah	Mr. Butler	Bristol
Williamson, Robert H.	Mr. Pratt	Bradford

LIVERPOOL CHEMISTS' ASSOCIATION,

PHARMACEUTICAL MEETING,

Royal Institution, Colquitt Street, Friday, August 3, 1849.

THE PRESIDENT IN THE CHAIR.

Dr. Inman commenced his lecture on the

STARCHES OF COMMERCE.

of which the following is an abstract:—

The word *starch* is a generic one, although usually restricted in commerce to one particular variety.

All amylaceous substances are essentially the same in their chemical characters and in their effect upon the animal economy, and the points of difference between any two are comparatively trifling.

Starch is a vegetable product, never being found in the animal kingdom, except when introduced from without. This observation had served Meyen, Ralfs, and others with a means of distinguishing between animal and vegetable life; and had reduced many so-called animalcules to the lowest order of confervæ, desmidiæ, &c.

He then reverted to the organs in which starch is usually found, and pointed out that its use in the vegetable kingdom is to provide nourishment for young shoots or branches before they are able to procure it directly from the soil. It is present also in many of those parts where active changes are taking place; in the stomata of leaves for example, and at the base of the petiole, and in the adjoining bark prior to the fall of the leaf. The colouring-matter of leaves is a modification of starch.

He then spoke of its chemical characteristics. It is coloured blue by iodine, both cold and hot, is insoluble in cold water, and apparently soluble in hot. This solution is not a true one, as he had succeeded under very favourable circumstances in procuring the starch again after it had been subjected to boiling for some time. To succeed in this experiment a great amount of dilution is necessary. The so called solution is at first very thick and glutinous, but after a while becomes watery and thin; after standing some time the solution precipitates, leaving a clear supernatant liquor. This being tested by iodine showed the existence of a very minute quantity of really dissolved starch.

Though insoluble in hot water alone, the addition of urine, and of some neutral salts, enables the greater part of the starch to be taken up — a small precipitate is left, consisting of the remains of the granules unacted on by either. This is the reason why urine is used so much in those processes of dyeing where starchy substances are employed to make the stuffs take the colours better.

In chemical composition starch is closely allied to sugar—into which it is readily converted by the action of saliva in the animal kingdom, and by germination or growth in the vegetable.

When examined by the microscope, starch is found to consist of granules of various sizes. Each granule has a point called the *hilum*, round which a number of irregularly concentric ellipses or circles are marked.

The size of the granule, the position of the hilum, and the distinctness of the concentric lines, vary in different species of plants.

After describing the characters of many of the principle farinas, or starches of commerce, he observed, that they might be divided into two classes, those with large granules, and those with small. In the former he placed the potato and wheat starches, and the *tous-les-mois*. In the latter he placed the different arrow-roots, sago, rice, barley, Indian meal, millet, and a variety of others. Any adulteration of arrow-root with the farinas of the first-class, he considered could be at once detected by the microscope; but he doubted if that instrument would throw any light upon its adulteration by sago, rice, or other farina with small granules.

There has been much discussion as to the true nature of the granules of starch, some contending that they are enveloped in a membrane, and others that there is no distinct capsule. After a careful consideration of the subject, he had come to the conclusion that there was some truth in both theories. There are two distinct substances in each grain, one which is readily acted on by water, the other which is not: in most cases the latter forms an outside coating, and looks membraniform; but in some, as the wheat and sago for example, the denser portion appears to have a different arrangement, and may be seen as a ring, a coil, or as divergent rays.

Double granules are occasionally found, which are accounted for by supposing two nuclei being in opposition at one of their margins, and becoming united together by additional layers.

He then drew attention to solutions of different forms of farina, all of which were of the same relative proportion with regard to the weight of starch and water employed. It appeared that potato-starch made the thickest solution, but was the first to become thin; that no essential difference could be detected between the Bermuda arrow-root, the Tahiti, the St. Vincent, the *tous-les-mois*, and the tapioca. All the other starches were very thin and watery.

He then adverted to the value of starch as food; noticed the difficulty of its digestion when taken cold and uncooked, and its ready dissolution in the stomach when taken after boiling; adverted to the influence of torrefaction in rendering the grains more digestible, and explained thus the advantage of baked flour over raw flour in preparing infants' food.

There are differences to be detected in the digestibility of the various farinas. Potato-starch is usually considered to produce flatulence and a disposition to diarrhœa, while arrow-root is considered to induce a tendency to constipation. On the whole, tapioca appears the best food for infants. No decided rule could, however, be laid down with respect to this, as each stomach appears to have an idosyncracy of its own.

After a few words upon the preparation of starch, and the necessity there was for its being always thoroughly washed from any adhering vegetable matter, he concluded by observing that he considered that all the arrow-roots, the *tous-les-mois*, and the tapioca, were of equal value as dietetics; that their difference in price was by no means a criterion of their respective goodness, and he would recommend those

with limited means to purchase a large quantity of low-priced arrow-root (say St. Vincent or South Sea) rather than a small quantity of the best Bermuda.

Dr. Inman then exhibited a number of starches under his powerful microscope.

Mr. E. Evans exhibited a number of medicinal plants from South America, of which he had the Spanish local names. The plants were in a dried state and well preserved.

Mr. H. S. Evans exhibited and presented to the Society a beautiful specimen of phosphate of lime.

A small fragment of mineral was laid aside and exposed for some hours to a temperature of about 100°, when it was found to have shot out beautiful acicular crystals, which increased in length to three or four inches. These covered the surface of the mineral, and curling up presented a delicate woolly appearance, perfectly white, and reflecting light like raw silk, or the wool upon a new blanket.

Mr. Shaw exhibited some fine specimens of the fossil popularly known as "petrified olives," and had been given to him as such; but which are, in fact, the spines of one of the family Echinidæ (*Genus cidaris*), and probably of the species *Cidaris cucumifera*. The spines closely resemble, in size and shape, the olive, with a short stalk.

The Secretary exhibited some resin-oil, or pine-oil, which is manufactured in large quantities near Liverpool, for the express purpose of adulterating other oils, as linseed, rape, &c., worth about £7 per ton. It is obtained by distilling resin at a high temperature. It has a powerful, disagreeable smell, and has a peach-coloured bloom by reflected light, which is very difficult of removal. It soon clogs machinery, and deposits carbon when burned.

A Member remarked that he believed it was now both decoloured and deodorised by a process in which nitrous acid was employed.

Dr. Dickenson's lectures were announced for the mornings of Tuesday, the 21st and 28th of August, and 4th of September. The next evening meeting was announced for the 31st inst., when Dr. Brett will deliver his first lecture on Toxicology.

ORIGINAL AND EXTRACTED ARTICLES.

CALIFORNIA IN IRELAND.

Much interest has been recently excited by the announcement of the discovery of a process by which the bogs of Ireland may be made as prolific of treasures as the gold regions of California. The following report of a discussion on this subject, which took place in the House of Commons on the 27th of July, is extracted from the *Times*:—

"Mr. O'Gorman Mahon took the opportunity of announcing a discovery of great importance relative to the development of the resources of Ireland, and which would materially enhance the value of landed property there; namely, that by a new process of distillation the millions of acres of peat might be made to yield chemical and other principles of much value. He produced a spermaceti-looking candle, which he warranted to

be of genuine peat matter, and which burnt brilliantly on the table during the evening.

"Lord Ashley had been assured by Mr. Owen, to whose character he bore the highest testimony, that the results of his experiments upon thousands of tons of peat, had proved that for an outlay of £20 for cost and labour, 100 tons would afford carbonate of ammonia, soda, naphtha, a substance adapted for candles, camphine oil, and other products, worth £91."

The bogs of Ireland are estimated at 2,800,000 acres, or nearly one-seventh of the entire surface of the island; and it has long been a subject of speculation whether these immense tracts of land could not be made to contribute to the improvement of the condition of the Irish people. Before alluding to the several means which have been suggested for that purpose, it may be well briefly to describe the general character of Irish bogs, and the supposed causes of their formation.

Bog consists of a mass of vegetable matter, in different stages of decomposition. It is supposed to owe its formation, in the first instance, to the accumulation of moisture, and other conditions favourable to the growth of mosses, especially of certain species of *sphagnum*. These and other aquatic plants, which absorb large quantities of water, form beds, on the surface of which new plants take root, and thus by the addition of successive strata of vegetable growth, the bog often acquires considerable thickness; and according to its thickness, age, and other circumstances, it presents different characters. Near the surface it is generally light coloured and spongy, the vegetable remains having undergone but slight alteration. At greater depths it is darker coloured, denser, and in a more advanced state of decomposition; and in some cases, at the bottom of old and deep bogs, it is black, and nearly as dense as coal.

These beds of vegetable remains sometimes extend to a depth of forty feet; and even those on the summits and sides of mountains are in some instances ten or twelve feet in thickness.

The chemical composition of bog, when in a tolerably advanced state of decomposition, is not very different from that of coal; but it contains a larger amount of incombustible matter, and, according to Sir Robert Kane's experiments, a much smaller proportion of nitrogen. It differs remarkably, however, in one respect from coal, and that is, in the proportion of water which it contains. Undried peat, that is, the bog cut for use as fuel, generally contains about 25 per cent. of water.

Bog, in the form of peat, has long been used as fuel, its calorific power being about half that of coal; but there is this great defect in peat fuel, that in consequence of its light and porous character the heat obtained by its combustion is too much diffused for many purposes. This defect has to a great extent been remedied by

submitting it to mechanical pressure in hydraulic presses. It has been found that the peat may be thus condensed to about one-third its volume, and at the same time deprived of much of its water. Even compressed peat, however, is incapable of producing heat of much intensity in ordinary furnaces ; but its property in this respect is greatly improved by converting it into charcoal. The charcoal of condensed peat is said to be of very excellent quality, its density being greater than that of wood charcoal. Even uncondensed peat affords very good charcoal for combustion, and for other purposes, which we shall have occasion to notice.

It is in the carbonization of peat that experimenters have discovered the most feasible means of turning the bog to profitable account. In converting peat into charcoal, a considerable part of the organic constituents are driven off in the form of volatile but condensible products, the nature of which will vary according to the circumstances under which the carbonization is effected. By conducting the process in such a way as to produce the greatest amount of valuable products, and by judiciously applying these products, it is conceived by certain parties who have directed their attention to the subject, that the bogs of Ireland may be made a source of wealth to the inhabitants of that country. Several processes have been proposed for this purpose. The method originally adopted, consisted of heating the peat in iron cylinders exposed to the heat of a furnace, in much the same way as coal is treated for the production of gas. But in making gas from coal, the object is to get a large proportion of the constituents of the fuel in a permanently gaseous condition, while in the carbonization of peat it is important to obtain condensible products to as great an extent as possible. The nature of the products of the distillation depends in a great measure upon the temperature to which the fuel is exposed. If the distillation be conducted at a low temperature, the fuel will yield much tar and comparatively little gas. Even the nature of the tarry product varies according to the temperature at which it is produced ; so that there is some scope for the exercise of skill and ingenuity in devising the best method of operating.

In submitting peat to destructive distillation in apparatus similar to that of the gas works, no more heat being applied than is necessary to ensure complete carbonization, the products consist of a porous charcoal, which remains in the retort, and of an aqueous liquor and tarry matter, which are collected in the condensing apparatus. We have seen this process conducted, and have examined the products.

The *aqueous liquor* is generally neither acid nor alkaline. Sometimes, however, it contains a little acetic acid, and more rarely ammonia is detected, but in very small quantity.

The *tarry matter* differs from coal tar ; it is much thicker, being of the consistence of butter, and of a brown colour. In proportion as the heat applied in the process is more intense, the tar assumes a thinner consistence and a darker colour.

The *charcoal* is rather light and porous, but it is quite equal in calorific power to common wood charcoal or gas coke, and for some purposes it possesses advantages over those fuels. It burns freely without smoke, and, when used in an open fire-place, affords a steady, clean, and cheerful fire, which is unaccompanied by the crackling of a common charcoal fire. This charcoal has been advantageously employed for deodorizing night-soil and preserving it for agricultural use. A notice of this application of it will be found in the last number of this Journal, page 87.

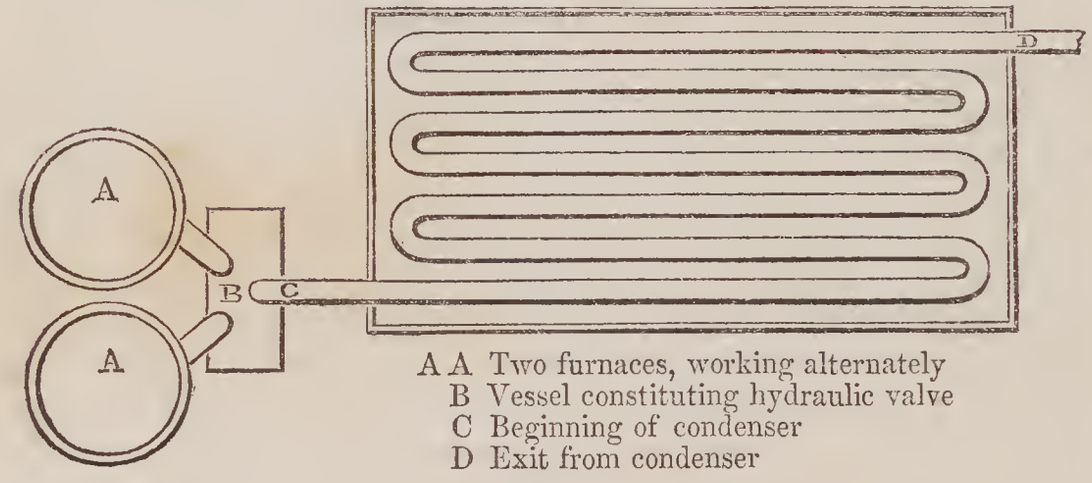
This process for the conversion of bog into available products has been in operation, or at least a manufactory for the purpose has been in existence, in this country for several years past. The locality selected for trying the project was Dartmoor, and the speculators were principally inhabitants of the neighbouring town of Plymouth. A capital of £20,000 was raised, which has been spent in the construction of works, and in a vain attempt to realize the sanguine anticipations of the projectors. We understand that the works have now passed into the hands of a new company, and that there is not a shilling left for the original shareholders. The failure of this undertaking has, by some, been ascribed to injudicious management, and extravagant expenditure of the capital in the construction of apparatus, which, when used, proved inapplicable for the purpose intended. There are others, however, who consider that the object contemplated cannot be advantageously effected by a process of distillation, such as that adopted at Dartmoor.

The new method of carbonizing peat, to which allusion was made by Lord Ashley in the House of Commons, as noticed at the commencement of this article, is the invention of Mr. Reece, a young Chemist, who has been working for several years in the laboratory of M. Pelouze in Paris, where the investigations upon which this process has been founded were conducted.

On the 23d of last January Mr. Reece specified a patent, sealed six months before, for a method of burning turf or peat, and condensing the volatile products. The patentee does not lay claim to any particular form of apparatus, but he claims—1. The employment of a blast of hot or cold air in a proper furnace for the combustion of peat, so as to be enabled to condense the volatile products in a vessel adapted to that purpose ;—2. He claims a mode or modes of treating the volatile products, named respectively, *paraffine*, and *paraffine* oil, so as to separate them, and render the paraffine pure enough to make candles. The first object is effected in a furnace similar to that shown in the drawing (a com-

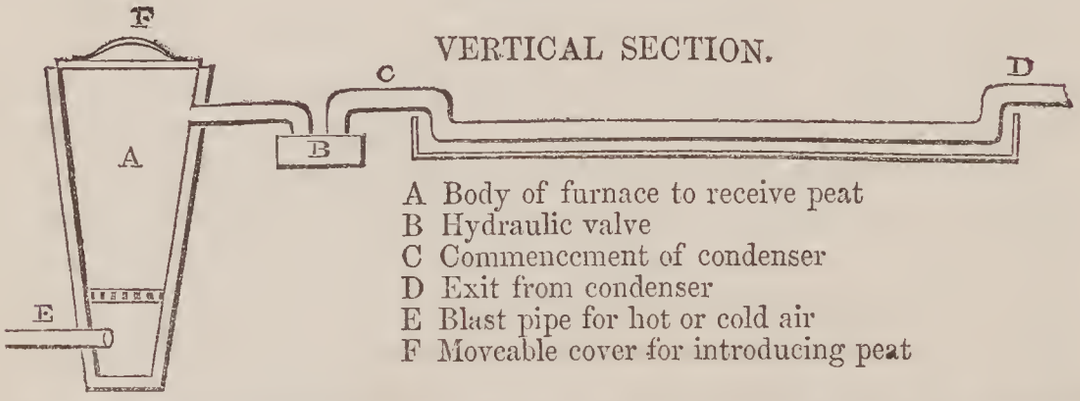
mon form of German stove) in which he forces in the air-blast beneath the grate, to be ultimately passed out at the end D of the zig-zag condenser, which is laid nearly flat, in a vessel filled with cold water. He thus condenses the paraffine, oil, and other liquids, but permits the gaseous matters to pass off into reservoirs, from which they can be conducted in pipes and burned, with the view of applying heat to any subsidiary uses. The second part of the process consists in re-distilling the liquid products, so as to separate the concrete and less volatile paraffine from the fluid solvent oils. This paraffine is to be purified by repeated distillations, and by pressure in a stearine press, and finally by a kind of sublimation (or distillation), till it becomes pure and white enough to make candles.

GROUND PLAN.



A A Two furnaces, working alternately
B Vessel constituting hydraulic valve
C Beginning of condenser
D Exit from condenser

VERTICAL SECTION.



A Body of furnace to receive peat
B Hydraulic valve
C Commencement of condenser
D Exit from condenser
E Blast pipe for hot or cold air
F Moveable cover for introducing peat

The patentee states, that by this process, in which the peat is exposed to a lower and more equally diffused heat than that which is required in operating in the way previously described, the volatile products obtained are different and more valuable. Among these products is ammonia, which is rarely obtained when the peat is distilled in retorts heated from without. He states also that the paraffine is an abundant constituent of the tarry matter, and that this may be economically purified by his process so as to render it fit for the manufacture of candles.

The principal point of novelty in Mr. Reece's patent is the introduction of air into the kindled peat, in order to carry on, as

would appear, a sort of semi-combustion, by which sufficient heat is generated to cause distillation, while there is not sufficient oxygen supplied to consume the fatty, oleaginous, and ammoniacal products.

This new project has been taken up by Mr. Owen, a respectable linendraper in Great Coram Street, and other men of capital, who are providing the means for submitting Mr. Reece's process to a practical test.

It is a remarkable fact that, the Plymouth speculators in the distillation of bog were mostly linendrapers. We hope Mr. Owen and his friends, profiting from the experience of their brethren, will be more cautious and prudent in the expenditure of their capital, and more successful in the result of their speculations.

THE EXPOSITION OF THE PRODUCTS OF FRENCH INDUSTRY, AT PARIS.

We noticed the last of these national exhibitions, which took place five years ago; and it may be interesting to some of our readers to learn what evidence has been afforded on the present occasion of the progress made by our Continental neighbours in the advancement of the various branches of arts and manufactures which the exposition is designed to encourage. Having occurred, as it has this time, at a period of unusual depression, consequent upon the political changes with which France has been so deeply agitated for nearly two years, it was thought by many persons in this country that the attempt at making a display worthy of a great nation would necessarily prove abortive—that the commerce of France had been completely paralysed, her manufacturers ruined, and her artisans destroyed or expatriated. Those whose imaginations have thus exaggerated the evils alluded to, which nevertheless have been abundant, and who from want of experience have under-estimated the resources of a community advanced in civilisation and teeming with active producers of wealth, will be surprised to find that at the appointed time, in accordance with the practice which has prevailed in France, with some slight interruption, for fifty years, a splendid edifice arose in the Champs Elysées, erected for the purpose at a cost to the nation of £30,000, and that upwards of 4000 exhibitors stocked this great national bazaar with the products of French industry. It will be seen from the following statement that there has been no falling off in the number of exhibitors at this, which is the eleventh exhibition of the kind:

Exposition.	Year.	Contributors.
1	1798	110
2	1801	220
3	1802	340
4	1806	1422
5	1819	1662
6	1823	1648
7	1827	1795
8	1834	2447
9	1839	3381
10	1844	3969
11	1849	4494

Among the exhibitors on the present occasion, there were no less than seventy-six manufacturers of chemical products, and eleven manufacturers of pharmaceutical products. Among the former were Kuhlmann and Co., Pelletier and Co., Delondre and Co., Mallet and Co., &c. &c. Many of the specimens were very beautiful, and some of rare occurrence, as, for instance, a large jar of digitaline from Messrs. Homolle and Quevenne. Gallic, tannic, and glacial acetic acids; chromate of potash; iodide of potassium; hyposulphite of soda, and sulphates of quinine and cinchonine, were among the prominent specimens. Pharmaceutical products were much less abundant. They included pill-moulds and machines, medicinal capsules of various kinds, diabetic bread, Alexander's mechanical leeches, opium from Algiers, &c. There was also a good show of chemical and pharmaceutical apparatus and utensils.

The general character of the exposition was by no means inferior to that of its predecessors, in regard to the quality and variety of products; yet those who had visited the exposition of 1844 could not help observing a great similarity in many of the articles exhibited on that and on the present occasion. In fact, the most apparent defect was the want of novelty—the absence of adequate indications of recent inventions and improvements in science and the arts. It was abundantly evident that practice at political clubs and barricades is unfavourable to the development of national industry.

Whilst admitting this defect, however, it is gratifying to be able to add the following testimony to an improvement in one feature of the exhibition, which we extract from *The Art Journal* of July:

"In almost every thing exhibited, an increase of refinement, a decrease of the *outré* and ridiculous may be easily observed. We find a considerably less distribution of unmeaning grotesques than ever, a purer feeling of the beautiful, and a happier result of the study of the best models, and adherence to the most orthodox principles of ornamental art. In fine, we are astonished and gratified at this national exhibition of the best productions of the country."

ON THE PURGATIVE PROPERTIES OF THE OILS OBTAINED FROM PLANTS INDIGENOUS IN THE ANTILLES.

BY W. HAMILTON, M.B.

Observing in the number of the *Pharmaceutical Journal* for July, a paper by Mr. Ure, "On the Purgative Properties of the Oil of *Anda*," I trust I may have the indulgence of your readers for calling to their recollection two papers inserted at page 167 of vol. iv. of that journal, and page 23 of vol. v. "On the Medicinal Properties of the Oils obtained from the Seeds of the *Argemōne Mexicāna*, *Hura crepitans*, and *Jatropha curcas*," indigenous products profusely scattered over our possessions in the West Indies, liberally presented by the hands of a bountiful nature to the acceptance of industry, and only waiting the education of science to take their places among the most valuable exports from those highly-favoured, but much misused and grossly neglected, regions.

Before I proceed further, permit me to express a hope that some of the Correspondents of the *Pharmaceutical Journal*, if not Mr. Ure himself, will enrich its pages with a description and figure of the *Anda Gomesii*, a plant of which many of its readers, and myself among the number, have probably now read for the very first time, and of whose history and localities they have hitherto been profoundly ignorant.

The *Argemōne Mexicāna*, yellow thistle, or prickly poppy, an herbaceous plant belonging to the order of Papaveraceæ, is an annual common in Nevis, St. Kitts, and most of the West Indian Islands, where it grows upon rubbish and by roadside, yielding its large golden blossoms, and capsules filled with multitudinous globular scrobiculated seeds at almost every period of the year. These seeds, gathered at the proper period of maturity, yield to pressure a bland purgative oil, possessing *anodyne* and *narcotic* qualities, which render it a most desirable addition to our anti-cholera remedies, and one to which I have repeatedly, but hitherto I regret to say fruitlessly, endeavoured to direct the attention of the medical world. The oil is occasionally to be met with among the negroes, who ask a quarter of a dollar, or about fourteen pence sterling, for a small phial of it, hardly containing more than from one to two ounces, and most frequently adulterated with the oil obtained by boiling or expression from the seeds of the *Jatropha curcas*, or common physic nut, which communicates to it drastic and emetic qualities that deteriorate its character, and impair its utility. When in a state of purity, however, the Materia Medica hardly presents a more valuable purgative, or one which answers so many apparently conflicting indications at one and the same time. In that excruciating complaint so common in all climates,

cholic arising from constipation of the bowels, thirty drops of this oil, taken upon a lump of sugar, allay the pain as if by magic, throw the patient into a profound and refreshing sleep, and after a little time produce a copious and unpainful evacuation of the bowels. The minuteness of the requisite dose, the instantaneousness of the relief it affords, and the mild and gentle though effectual action it produces in the intestinal canal, seem peculiarly to adapt it for cases of cholera, superseding the use of chloroform and opium for subduing the cramps, and mitigating the more urgent symptoms. The oil, I conceive, may be most easily and copiously obtained from the recently gathered seeds in the places which produce the plant, and not from those which are over ripe, or which have become dry by long keeping. Cultivation, and the appliances of horticultural skill, would no doubt improve the quality, and increase the quantity, of the produce, while *adulteration* should be guarded against with the utmost vigilance. For the other properties of this valuable but neglected plant, I must refer to the accounts already given at page 167 and the following of vol. iv. of the *Pharmaceutical Journal*.

The *Jatropha curcas*, or common physic nut, is a plant of the natural order of Euphorbiaceæ, common in all the hedges in Nevis and St. Kitts, where it attains a height of from six to seven feet, and may be found in flower and fruit throughout the year. The seeds, which are nearly of the same size with those of the *Ricinus communis*, yield, on pressure, an oil which, in the crude state in which it is usually obtained, is powerfully drastic and emetic. But, from what some writers state, it would appear that the acrid property of the oil arises from some deleterious principle resident in the cotyledon leaves which divide the kernel into two equal parts; and the removal of which, previous to the operation of pressing, would divest the oil of its objectionable qualities, and render it as bland and efficacious in its operation as that obtained from the seeds of the *Argemone*. And I am the more inclined to this opinion from the resemblance, in many of its medicinal properties, which exists between the milky juice of both plants; and from the powerfully anti-spasmodic effects of a decoction of the leaves, which the celebrated Dr. Wright, of Jamaica, assures us "is often used with advantage in spasmodic belly-ache (cholic) attended with vomiting, sitting easier on the stomach than anything else, and seldom failing to produce a discharge by stool." The usual dose of the oil is a table-spoonful, or about half an ounce. From the abundance of the *physic* nut, the facility with which it is propagated, and the abundance of oil which it affords, the *Jatropha curcas* is eminently entitled to the attention of those philanthropists who would raise our West India colonies from their present state of suicidal prostration, by the cultivation

of their *natural* capabilities, rather than by the horrors of immigration, the resuscitation of monopoly, or the oppression of the Creole peasantry. For farther information respecting the physic nut, I must refer to the paper published in the fifth volume of the *Pharmaceutical Journal*, page 25 et seq.

The *Hura crepitans*, or sand-boxtree, is a small tree remarkable for the extreme brittleness of its timber and the slowness of its growth. It belongs, according to Sprengel, to the Tricoccæ of Linnæus, and attains a height of about thirty feet, with spreading branches, which afford an agreeable shelter from the fervid heat of the sun, to a distance of sixty feet frequently in diameter; but even the largest of these branches are so singularly brittle, as to snap with a sudden gust of wind or even a loud peal of thunder. It thrives best in a deep rich soil, and in the vicinity of water, and is cultivated, for the sake of its shade, near the houses of the planters.

The seeds, which are contained in the cells of an extremely compressed circular capsule, marked externally by deep furrows, corresponding to the number of the cells and seeds within, possess, when recent, a strongly emetico-cathartic quality; insomuch that the new-comer, who, tempted by the agreeable flavour of the kernel, imprudently eats even so much as a single one, is usually attacked with a severe vomiting and purging within a very few minutes after. This effect may be counteracted, as far as the emetic operation is concerned, as an American captain whom I met in the West Indies informed me, by splitting the kernels in two, and carefully removing the *cotyledon leaves*, in which the emetic principle appears wholly to reside. Thus prepared, he constantly carried them about him, and found four or five eaten in the morning relieve his bowels without sickness, pain, or griping. The oil obtained from the *recent* seeds, *similarly prepared*, would most probably be found a valuable addition to the eccoprotics of our Materia Medica. With age the seeds become almost totally inert. I have myself eaten several with the most perfect impunity, but I should not advise others to act with equal imprudence.

14, *Octagon, Plymouth, 6th August*, 1849.

TEST FOR STRYCHNIA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—It has been pointed out to me that a test for Strychnia, similar to that which I lately proposed, is noticed in Mr. Taylor's excellent work on Medical Jurisprudence. It appears to have been originally discovered by Messrs. Marchand, Mack, and Otto.

By inserting this you will oblige, Sir, your most obedient Servant,

August 20, 1849. Lewis Thompson.

GLYCERINE IN DEAFNESS.

The following letter from Mr. Yearsley to the *Worcester Herald* has been quoted in the *Medical Gazette* :—

TO THE EDITOR OF THE WORCESTER HERALD.

Sir,—In your report of the proceedings of the Provincial Medical Association, I observe that my name is quoted as an advocate for the use of the oil of glycerine in deafness—in fact, it is actually denominated "Mr. Yearsley's new remedy, Glycerine."

I trust I shall never be guilty of anything half so absurd as to recommend this or any other lubricating fluid to be applied to the outer passages of the ear for deafness. For years past I have denounced in my writings all such antiquated notions of treatment, which ought not to be talked of in the nineteenth century, and in the present state of our knowledge of diseases of the ear.

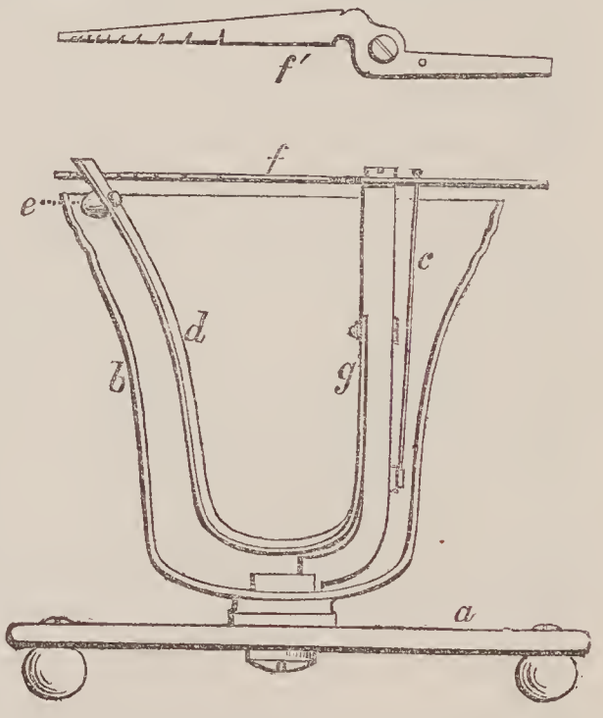
I beg that you will correct this error in your report, and oblige, Sir,

Your very obedient servant,

London, 15, *Saville Row*, *Aug. 8th*, 1849. J. YEARSLEY.

THE SONOMETER.

Mr. Wakley continues to recommend glycerine. We subjoin a description and cut of an instrument which he uses for testing the efficacy of treatment in deafness. Time and the sonometer will settle the question at issue between these two authorities.



The sonometer is a simple and easily managed instrument, and consists of a small bell, *b*, fixed on a table *a* ; the pillar, *g*, which supports a serrated bar, *f*, is kept in its place by a delicate spring, *c* ; the spring *d* has attached to it a small hammer, *e* ; this spring being placed in the teeth of the serrated bar, *f*, is relieved by the handle, *h*, being touched by the finger, which regulates the extent of sound, from the ticking of a watch to the sharp loud tone of a bell. By means of this instrument the exact amount of hearing which a patient possesses can be measured with the greatest accuracy before the treatment commences, so that no doubt can exist as to whether the patient is relieved by the remedy. The instrument is equally available in every form of deafness.

ON THE PREPARATION OF NITROGEN.

BY M. B. CORENWINDER.

The preparation of nitrogen is attended with many inconveniences. Of the several processes which are adopted in laboratories there is not one by which it can be obtained rapidly and in a state of purity, unless much precaution is taken, and complicated apparatus employed. This circum-

stance has induced me to publish a process by which I prepare, in a few minutes, an abundant supply of the gas, and in a state of absolute purity, as is proved by the results about to be given.

This process is founded on the decomposition of nitrite of ammonia, which, as is already known, is resolved into nitrogen and water under the influence of heat; but as this salt is difficult to prepare, I replace it by a mixture of an alkaline nitrite of potash and sal ammoniac, a mixture which contains the elements of nitrite of ammonia and chloride of potassium.

The best method of obtaining the nitrite of potash in a convenient state, is to pass nitrous acid gas, formed by the action of ten parts of nitric acid on one part of starch, through a solution of caustic potash having a specific gravity 1.38, until the solution acquires an acid reaction; and then to add a little caustic potash, so as to render it distinctly alkaline. As the solution thus prepared does not undergo alteration from keeping, it may be kept in readiness; and when the nitrogen is required, it is only necessary to mix one volume of the above solution with three volumes of a concentrated solution of sal-ammoniac, and to heat the mixture in a flask. The disengagement of the gas takes place almost immediately, and continues with great regularity.

As it is necessary, in order to have the gas pure, that the nitrite should be alkaline, there will be a disengagement at the same time of a little ammonia, but this is of no consequence; if the nitrogen be required completely free from ammonia, it is sufficient to pass the gas through a vessel containing water acidulated with a little sulphuric acid.

The following are the experiments by which I have satisfied myself of the purity of the nitrogen thus obtained:—

1. After freeing the gas from ammonia, as above described, it was conveyed into a tube containing a mixture of zinc, sulphuric acid, and water —into the presence, therefore, of nascent hydrogen. The experiment was continued for some time, and when concluded I could not detect a trace of ammonia in the solution.

The result was also negative on testing it with sulphate of iron and dilute sulphuric acid.

2. I placed in a glass-tube, such as is used for organic analysis, a determined quantity of copper recently reduced by hydrogen, and exposed this for half an hour to the action of a red heat and of a current of the nitrogen washed and subsequently dried by passing it through pumice-stone wetted with oil of vitriol; taking at the same time the precaution not to heat the tube until all the atmospheric air had been displaced by the nitrogen. This experiment was repeated several times without any alteration being observed either in the exterior appearance of the copper or in its weight.—*Annales de Chimie et de Physique.*

FORMULÆ FOR THE PREPARATION OF SEALING-WAX.

BY F. X. POTTINGER.

Mr. Pottinger of Triesch recommends the following formulæ for the preparation of sealing-wax:—4 ozs. of Venetian turpentine are melted with 7 ozs. shell-lac in an earthenware vessel over a slight charcoal fire. Then $2\frac{1}{2}$ ozs. of cinnabar and $1\frac{1}{2}$ drachm of carbonate of magnesia are to be mixed with oil of turpentine into a thick paste; and having previously added to the first mixture $2\frac{1}{2}$ ozs. dry cinnabar, the paste is immediately added; the whole being constantly stirred until bubbles arise, when the mixture is removed from the fire and stirred till the bubbles disappear. The mass is then poured into tin moulds, the interior of which must be greased with oil of almonds. When the sticks are hardened they

are polished by being quickly drawn through a charcoal fire or spirit-flame.

The following formulæ are warranted.

Fine Red.—4 oz. Venetian turpentine, 7 ozs. shell-lac, 4 ozs. cinnabar, 1½ drachm magnesia with oil of turpentine.

Fine Red, No. 1.—The same formula, except 3½ ozs. cinnabar instead of 4.

Red, No. 2.—4 ozs. of Venetian turpentine, 6½ ozs. shell-lac, ½ oz. colophony, 2½ ozs. cinnabar, 1½ drachm magnesia and oil of turpentine.

Red, No. 3.—4 ozs. Venetian turpentine, 6 ozs. shell-lac, ¾ oz. colophony, 1¾ oz. cinnabar, &c.

Red, No. 4.—Turpentine and shell-lac like No. 3, colophony and cinnabar each 1½ oz., magnesia, &c.

Red, No. 5.—4 ozs. turpentine, 5½ ozs. shell-lac, 1½ oz. colophony, 1¼ oz. cinnabar, magnesia, &c.

Fine Black, No. 1.—4½ ozs. Venetian turpentine, 9 ozs. shell-lac, ½ oz. colophony, lamp-black mixed with oil of turpentine as much as is required.

Black, No. 2.—4 ozs. Venetian turpentine, 8 ozs. shell-lac, 3 ozs. colophony, lamp-black, and oil of turpentine.

Yellow, No. 1.—2 ozs. Venetian turpentine, 4 ozs. shell-lac, 1¼ oz. colophony, ¾ oz. king's yellow, 1½ drachm magnesia and oil of turpentine.

Dark Brown, No. 1.—4 ozs. Venetian turpentine, 7½ ozs. shell-lac, 1½ oz. brown English earth (ochre), magnesia as above.

Brown, No. 2.—4 ozs. Venetian turpentine, 7 ozs. shell-lac, 3 ozs. colophony, 1½ oz., English earth (ochre), magnesia, as above.

Light Brown, No. 1.—4 ozs. Venetian turpentine, 7½ ozs. shell-lac, 1 oz. brown earth, ½ oz. cinnabar, ½ oz. prepared chalk, magnesia as above.

Light Brown, No. 2.—4 ozs. Venetian turpentine, 7 ozs. fine shell-lac, 3 ozs. colophony, 1½ oz. English earth, ¼ oz. cinnabar, 1 oz. washed chalk, magnesia as above.

Dark Blue, No. 1.—3 ozs. Venetian turpentine, 7 ozs. fine shell-lac, 1 oz. colophony, 1 oz. mineral blue, magnesia as above.

Green, No. 1.—2 oz. Venetian turpentine, 4 ozs. shell-lac, 1¼ oz. colophony, ½ oz. king's yellow, ¼ oz. mountain-blue, magnesia as above.

Carmine Red, No. 1.—2 ozs. Venetian turpentine, 4 ozs. shell-lac ; 1 oz. colophony, 1½ oz. Chinese red, 1 drachm magnesia, with oil of turpentine.

Gold, No. 1.—4 ozs. Venetian turpentine, 8 ozs. shell-lac, 14 sheets of genuine leaf gold, ½ oz. bronze, ½ oz. magnesia with oil of turpentine.

WARBURG'S FEVER TINCTURE.

This arcanum, which is a valuable medicine against the ague, has been chemically examined by a commission appointed for this purpose in Vienna. Twenty bottles were obtained for examination from the warehouse of T. Müller and Co., in that city ; and the following are the properties of the tincture as reported by the commission :

The tincture is of a brownish red colour; it colours the glass [the bottle ?] intensely yellow when shaken, and adheres to it, although it is very liquid. Its predominating odour is camphoraceous and saffron-like ; its taste is pure bitter.*

The commission then divided into three sections, each of which separately analysed the tincture. The results were as follows :

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* In 1844, Dr. Buchner examined the fever tincture, and found its colour not brownish red, but dark yellowish brown ; and its taste not pure bitter, but aromatic bitter.

Section A. stated the tincture to be a compound of
Sulphate of quina,
Aloes,
Camphor, and
Saffron.

Section B. declared it to contain
Sulphate of quina,
Aloes,
Angelica,
Zedoaria,
Camphor,
Saffron, and
Rhubarb.
} in Alcohol.

Mr. Apothecary Fuchs, who represented *Section C.*, gave as the result of his analysis, the following recipe for preparing Warburg's Fever Tincture :—

℞ Aloes hepaticæ,
Rad. Zedoariæ, āā ʒj.
" Angelicæ
Camphoræ, āā gr. ij.
Croci Austriaci, gr. iij.
Spiritus v. rectificati pur. (0.910 sp. gr.) ℥iij. In colatura filtrata unciarum trium et drachmæ unius solve.
Chinini sulphurici (quinæ sulphatis) gr. xxx.

Dispensa pro dosi drachmas quinque.

According to these results, which agree in the main with those obtained by Buchner and Winckler, it cannot be doubted that the most effective constituent of Warburg's Tincture is sulphate of quina, of which six grains are contained in a bottle of about five or six drachms of the tincture.—*Buchner's Repertorium*, 3tte Reibe, Bd. ii., 1848.

ON BEES' WAX.

BY DR. A. VOGEL, JUN.

The resolution of bees'-wax into cerin and myricin by means of boiling alcohol has always furnished but unsatisfactory results ; Dr. Vogel, jun., therefore, employed chloroform, and found that from six to eight parts of this liquid poured over pure white wax, and left standing for some time at the common temperature, invariably dissolved one-fourth of the wax, and left three-fourths as residue. If the chloroform be then evaporated, it leaves behind a soft clammy substance, which easily dissolves in chloroform. The portion of wax undissolved is granular and very friable. It is, however, as yet undecided whether the two substances thus obtained from wax are identical with cerin and myricin or not. However this may be, chloroform offers a convenient test for discovering the adulteration of white wax with tallow or stearic acid, since these substances are already easily and perfectly dissolved by it at a low temperature. If, therefore, white wax, on being treated with six or eight times its own weight of chloroform, loses more than one-fourth of its weight, this must be considered as a proof of its being adulterated.—*Buchner's Repertorium.*

ON RHINE WINES.

The following results of experiments, performed by Geiser with the most scrupulous attention, are communicated by Liebig (*Ann. d. Chem. und Pharm.* lxv., 356), and accompanied by some very important observations.

The various sorts of Rhine wine were all of the growth of the year 1822, and are here enumerated according to their value in a descending scale.

Place of Growth.	Sort of Grapes.	Specific gravity.	100 Parts yielded.	
			Absolute Alcohol.	Dry Residue.
Steinberg	Riesling	1.0025	10.87	9.94
Rüdesheim	Orleans	1.0025	12.65	5.39
Markobrunn	Riesling	0.9985	11.60	5.10
Geisenheim	—	0.9935	12.60	3.05
Dirnheim	—	0.9925	9.84	2.18
Weinheim, Hubberg	—	0.9925	11.70	2.18
Worms, Liebfrauenmilch	—	0.9930	10.62	2.27
Bingen, Scharlachberg	—	not determined	12.10	not determined
Eisler, Kleinberger	—	—	11.90	
Wiesbaden / Neroberg	—	0.9950	10.83	2.78
Wiesloch	—	0.9945	9.83	2.48

From the known prices of these wines, it is obvious that the proportion of alcohol, although one factor in determining the value of a wine, is not the only absolute one, nor does it stand in any fixed relation to the commercial value of the wine. It is remarkable that the finest sorts of wine contain a much greater proportion of solid substances in solution than the inferior sorts; and that the weight of the residue which the Rhenish wines yield on evaporation, offers a safer criterion for determining their commercial value than the proportion of alcohol.* These solids disguise the acid, take off the acrid taste, and at the same time impart body, mellowness, and oilyness. Among the extractive matters of new wines, are sugar, which gradually disappears by keeping; and also some imperfectly-known gummy substances, which become brownish when the wine is submitted to evaporation. The presence of these in wine appears chiefly to be determined by the soil, and the condition and locality of the vineyard; and it is obvious that the qualities dependent upon these extractive matters cannot be replaced by sugar.

It is of importance that the free acid be not removed before the fer-

* The same is also the case with wines from the Palatinate; Herxheimer Riesling of 1844 is sold at 24 kr. the bottle; and Deidesheimer- and Forster-Riesling of the same year at 33 to 36 kr. per bottle; and after evaporation I found in the first only 8.7 parts of solid substances in 100 parts. This so-called extract of wine is yellowish brown; at 212° Fah. it is still viscid, very hygroscopic in the air, and of a very acid taste; besides supertartrate of potash it contains a free vegetable acid, which is analogous to citric acid. Small proportions of sulphuric and phosphoric acids are neutralized by potash, lime, magnesia, ammonia, and a small quantity of protoxide of iron. If the free acid of this wine be saturated by potash, the liquid evaporated, and a mixture of sulphuric acid and alcohol dropped on the residue, which is then heated, a peculiar agreeable smell developes itself, almost like that of Malaga wine, but no smell of acetic ether.—*Buchner.*

mentation, because on its presence during this process, as well as during the stoving, depend the taste and principal qualities of the wine. If the acid of the must be neutralized prior to fermentation, this process is not prevented, but a fermented liquid is obtained which has no longer any resemblance to wine, and which even by keeping never recovers the odour and taste it ought to possess.

In France an artificial, and therefore fugitive bouquet is produced, especially in Bordeaux wines, by allowing the fermentation of the unpressed grapes to proceed at a rather high temperature, and under but very slightly limited access of air. In most Bordeaux wines this bouquet is acetic ether; but it is not unlikely that under these circumstances butyric ether is also produced. The want of free acid, as may easily be seen, is here supplied by means which promote the generation of acid.

STERLING'S PROCESS OF MAKING AMBER VARNISH.

In manufacturing amber varnish according to Mr. Sterling's method, the amber (which has to be submitted to high temperature to melt it) is introduced into a stout copper vessel, which is closed at top and luted with clay. This vessel is furnished at its lower end with a funnel-shaped vent, which carries a perforated sheet of iron or sieve, sufficiently fine to prevent the escape with the melted amber of any impurities which might be contained in the amber. This vessel is introduced into a large chafing-dish fixed upon a high stand, and its tapering bottom projects through a hole in the bottom of the chafing-dish, and extends a few inches downwards. When the vessel is thus adjusted, the chafing-dish is nearly filled with coal and lighted. The fuel is, by the peculiar form of the chafing-dish, prevented from dropping into the oil vessel, to be presently described, and thereby soiling the liquid.

The heat from the ignited fuel very soon heats the vessel to such a temperature as will melt the amber and cause it to flow through the perforated metal or sieve above mentioned, in passing through which it will be purified from all extraneous matters. The melted amber runs into a copper vessel which is placed below the chafing-dish, and is provided with a long handle. This vessel or receiver is filled about two-thirds full with the oil from which it is intended to prepare the varnish, and is placed upon an ordinary chafing-dish charged with incandescent fuel, which heats the amber to such a temperature as to cause it to become incorporated with the oil. When this is completely effected, the vessel is cleansed for a fresh operation, and the other ingredients necessary for the manufacture of the varnish are added to the mixture of oil and amber, as soon as it has cooled down to a suitable temperature.

These very simple means present the following important advantages over those now in use for the manufacture of varnishes:—

1st. The amber melts completely without any residuum; and as it is contained in a perfectly tight vessel, nothing, or next to nothing, is lost by the evaporation of its constituent parts.

2d. The application of a high temperature effects the fusion with ease and rapidity.

3d. This mode of preparing varnishes is perfectly free from danger as regards fire. The amber is contained in a perfectly close vessel, and cannot, therefore, take fire, especially as the air has no access through the spout through which the melted amber flows. Neither will the oil through which the melted amber flows be liable to take fire, for it does not require to be heated to a very high temperature, as is at present the practice,—the amber being now melted and dissolved in oil heated to the point of violent ebullition. And further, the chafing-dish is small, and it is impossible it can

communicate to the vessel filled with oil (which is of much more considerable capacity) sufficient heat to cause fear of fire.

4th. All the vessels are of stout copper, and consequently are not liable to burst, as is the case with the earthen ones, which are at present too often employed.

It will thus be seen that, independently of the practical advantages which this method of manufacturing varnish (and which has already stood the test of long experience) possesses over those ordinarily in use, it has the important one of being unattended with danger.—*The Technologiste, as translated in the London Journal.*

POLARIZATION OF HEAT.

The recent experiments of MM. F. De la Provostaye and P. Desains, with solar heat passed through achromatized spar, resolve a great number of questions which have not hitherto been worked out, in regard to the properties of the calorific rays that become polarized. The principal results are—1st. That the heat that traverses the spar divides itself into two bundles of equal intensities, completely polarized in the plane of the principal section, and in the perpendicular plane.—2nd. That the law by which, according to Malus, the intensity of a ray completely polarized is divided between the ordinary and extraordinary images which are produced in the traversing spar, is as applicable to heat as to light.—3rd. That the variations which the intensity of polarized heat undergoes by reflection from glass at different incidences, are exactly represented by Fresnel's formula for light, admitting, for the solar heat which traverses the prism, a sign slightly differing from 1.5.—4th. That the resemblance is still more striking between the phenomena which polarized heat and light present, reflected from polished metals.—*Literary Gazette.*

THE ELECTRIC LIGHT.

The following sensible remarks on the present prospect of the *electric light* being made practically available for useful purposes, are extracted from a recent publication by Mr. J. O. N. Rutter, F.R.A.S.

Whether the electric light will ever be so complete, both in its mechanical and voltaic arrangements, as to be of any practical utility, or whether it will remain, as at present, a wonderful illustration of electrical agencies, and nothing further, are questions which must be left for futurity to answer. The man is more bold than wise, and proves himself no safe guide in such matters, who ventures to solve either of them now. That which appears impossible to-day, might, perhaps, be easily accomplished to-morrow. The annals of science, and of invention, are crowded with examples in which one happy thought, one simple condition, one little lever, or wheel, or pinion, has finished, and crowned with success, the labours (with its attendant losses and disappointments) of many years. But we must look also on the other side; and there are found discoveries and inventions, and machines, without number, which, for want of a happy thought, a required condition, a lever, a wheel, or pinion, in the right place, still remain unfinished.

In the mechanism of the electric light some improvements have been made. In other respects the progress is remarkably slow. Patent after patent has been granted; years of labour and large sums of money have been expended; but, as respects real usefulness, nothing seems to have been accomplished. A light of dazzling brilliancy can be shown for a few minutes at a time. Sir Humphrey Davy did this; and hundreds of

others, some for amusement, some for instruction, have done the same. Steadiness and continuity are qualities essential to all methods of artificial illumination. In each of these qualities the electric light is deficient. If it be so cheap that light equal to 100 candles costs only one penny per hour, if it be so easily managed that it can be as readily adapted in lighting a private house as the most extensive building, and whether the light required be equal to 10, or 100, or 100,000 candles, might it not have been expected that, privately or in public, at least one specimen of the light would have been kept in action for a few hours every night, to have demonstrated its capabilities?

Those who understand the details of the process,* do not wonder that the electric light is intermitting and uncertain. To maintain, at a high intensity, an uniform power in a voltaic battery, is sufficiently difficult; to adjust the carbon points, even by the aid of the most ably-constructed machinery, is apparently impossible. Increase or diminution of power in the battery renders necessary a new adjustment of the carbon. Differences in the quality of the latter, or the admixture of impurities, also interfere with the success of the operations. Machinery, however sensitive, cannot adapt itself to these constantly varying conditions. It may be perfect in its motions, and exact in its graduations, but still it cannot *think* about its work, or *know* what it has to do; and hence, in this instance, it fails in performing all that is required. At one period of the process the carbon point may probably be required to move at the rate of $\frac{1}{100}$th of an inch in a certain time, at another the required rate may be $\frac{1}{1000}$th, or $\frac{1}{10000}$th of an inch in the same time. Herein consist some of the practical difficulties. These are only a small part of them.

As respects cost, nothing at present need be said. It will be time enough to discuss the economy of the process when all other objections, and especially those of manipulation, are cleared away. If electric power could be obtained without cost, that would not aid the invention. The causes of failure are more recondite than the prices of acids and of metals. In the present state of our knowledge, and notwithstanding all the so-called recent improvements, the electric light remains, what it has hitherto been, a very impressive and very brilliant philosophical experiment, and nothing more.

ON ASCLEPION.

BY C. LIST.

Dr. C. List has made in Wöhler's laboratory some experiments with the milky juice of *Asclepias Syriaca*, and discovered in it a peculiar crystallizable substance, similar to resins, and which he calls *asclepion*.

When the milky juice is examined by a strong magnifying power, it is observed to contain a granular matter, and a few yellowish drops of oil. The juice re-acts slightly as an acid, and has an acrid taste and an odour somewhat resembling that of apricots. The albumen contained in it coagulates when heated, and so completely envelopes the small particles of asclepion that the liquid part can be filtered from it perfectly clear.

From this coagulum the asclepion is extracted by means of ether; and when the latter has been separated by distillation, the asclepion crystallizes and is obtained pure, after repeated crystallizations from anhydrous ether.

* The light is produced by a current of electricity, generated by a powerful voltaic battery, and which is transmitted through small cylinders of carbon (charcoal) extremely hard, and as pure as it can be obtained. The points of the carbon are not in contact. The light is formed in the space between them, and is caused by the interruption of the electrical current in passing from one piece of carbon to the other.

In a pure state, asclepion is a white, cauliflower-like crystalline mass, the solution of which being very slowly evaporated, leaves behind finely radiated concentric crystals. It possesses neither taste nor smell, and is insoluble in water and alcohol. In ether it readily dissolves ; less so in oil of turpentine, naphtha, and concentrated acetic acid. A boiling solution of caustic potash neither alters nor dissolves it. It easily fuses at about 219° Fahr., and remains then amorphous and perfectly clear ; if exposed to a higher temperature it becomes yellow, undergoes decomposition, and gives off an odour similar to caoutchouc. It cannot be sublimed.

The analysis of asclepion dried over sulphuric acid was as follows :

	Experiments. I.	Experiments. II.	Atoms.	Calculations.
Carbon	74.852	74.514	20	74.576
Hydrogen	10,767	10.452	17	10.532
Oxygen	14.381	15.034	3	14.892

Wöhler observes, that the formula of this substance is perhaps double that here given, since in its physiological and other properties it is related to Lactucon, whose formula is assumed to be $C_{40}\ H_{33}\ O_3$.—*Liebig's Annalen.*

MODE OF SILVERING GLASS BY THE EMPLOYMENT OF GUN-COTTON.

M. Vohl has recently discovered that a solution of gun-cotton in a caustic ley possesses in a high degree the property of precipitating silver from its solutions in the metallic form. In fact, on bringing gun-cotton into contact with a caustic ley of sufficient strength, the cotton will become dissolved in the ley, giving out ammonia with a considerable degree of heat, and producing a deep brown liquid, somewhat thick. On pouring an acid into this, a brisk effervescence is produced, carbonic acid and nitrous acid being disengaged.

The action of the gun-cotton in this instance shows that it is not simply dissolved, but undergoes decomposition, by which the atoms of oxygen in the nitric acid enter into combination with the atoms of carbon in the cotton, thus producing carbonic acid, which, as well as the nitrous acid produced by the nitric acid, combines with one part of potash. A fresh decomposition of nitrous salt by the potash, in the presence of hydrogenated substances, furnishes ammonia.

The most remarkable property of this alkaline solution is the following : On pouring into it a few drops of a solution of nitrate of silver, and adding ammonia until the oxide of silver formed is redissolved (the mixture being slowly heated in a water-bath), the liquid will at a certain period assume a deep brown colour and effervesce, the whole of the silver being precipitated on the sides of the vessel. The mirror thus produced is much superior in brilliancy to those produced by means of ethereal oils or ammoniacal aldehyde ; and the facility with which it is produced will doubtless render it of practical importance.

This property is not exclusively possessed by gun-cotton ; it is found also in cane-sugar, sugar of milk, manna, gums, and other substances which may be rendered explosive by treating them with nitric acid. Nitropicric acid produces under the same circumstances a reflecting metallic surface ; and it appears that this reaction takes place with all bodies which, when treated with nitric acid, do not furnish products of oxidation, but another series of bodies, which admit of carbonic acid forming one of their constituent parts.—*Technologiste ;* and *Newton's Journal*, May, 1849.

ON SENNA LEAVES.

BY F. L. BLEY AND E. DIESEL.

Messrs. Bley and Diesel have submitted *Senna obovata*, *S. Alexandrina* and *S. Tinnevelly* to chemical examination, and obtained the following results:—Volatile oil and malic acid could not be discovered in the senna. The leaves of *Cassia lanceolata* and of *C. obovata* left 11 or 12 per cent. of alkaline ashes, in which chloride of potassium, traces of lime, magnesia, and soda, were found mostly combined with carbonic acid, and also phosphoric and silicic acids. Senna leaves also contain a peculiar *yellow resin*, probably the same which Feneulle obtained in the impure state from senna-pods. Messrs. Bley and Diesel call it *Chrysoretin*. The *brown resin* and the *brown extractive matter*, which was called by Lassaigne and Feneulle *Cathartin*, cannot be completely separated from each other. *Pectin*, *gummy extractive matter*, *chlorophylle*, and a small quantity of *fat*, were also found.

Although the authors were not able to isolate the active principle, yet they are of opinion that Alexandrian senna is more active than either the obovate or Tinnevelly senna, because it yields a larger quantity of a spirituous extract, having a superior odour and taste. This property is used as a measure, for spirit of wine also dissolves almost all the constituents which water takes up from the leaves. At the same time, it is observed as a striking circumstance, that the alcoholic extract of half an ounce of senna (which had been perfectly exhausted by spirit of wine) produced only nausea and uneasiness, and could therefore contain but little of the active principle. As regards experiments concerning the efficacy of the individual constituents of senna, we have the following results:—the *chrysoretin*, in doses of from 30 to 45 grs., remained without effect; the *brown resin*, in doses of from 15 to 80 grs., did not operate upon the bowels, but merely caused nausea, and in larger doses, vomiting. In large doses of 60 grs., it appeared to operate as a diuretic, and could be detected after a short time in the urine, in consequence of the colour which it assumes on the addition of potash. The so-called *cathartin*, in doses of two-and-a-half to three drachms, caused only nausea and disagreeable eructation, without operating upon the bowels.

These experiments tend to show, that the individual constituents, extracted by spirit of wine from the senna leaves, as well as their aggregate, do not purge. The authors, however, doubt the statement of Heerlein, that spirit of wine only extracts from the leaves macerated in it inert substances, and none of the active principle. The final result to which they are led by their examinations is, that odour, taste, relation to chemical agents, and medicinal powers of senna, depend chiefly on the co-operation of the extractive matter and the resin, and only in a subordinate degree on the pectin, the pectates, and the other salts of the leaves. No share in the activity can be ascribed to the volatile oil, as no appreciable quantity of it can be procured.—*Pharmaceut. Central Blatt*, für 1849, No. 8.

ON COLLODIUM CANTHARIDALE.

BY F. ILISCH.

According to Dr. Ilisch of St. Petersburg, collodion (or collodium) in combination with cantharidin, is in many cases well adapted to act as a vesicant, supplying not only the place of the *emplastrum cantharidis*, but affording even the advantage of dispensing with linen and leather. It is particularly useful in cases where a strong vesicant is to be applied to a part of the body where it can be easily disturbed by the movements of the

patient, or where the irritability of the latter prevents the undisturbed position of the plaster.

For its application, nothing is required but to paint the part with it by means of a brush. If, after the collodium has been thus applied and dried, which occurs within about half a minute, some part of the skin is found not to be perfectly covered by it, the application is to be repeated; and the effect is quicker and safer if the part be covered with lard or melilot plaster. The collodion operates as speedily as blister plaster, and possesses the advantage of not staining the linen.

Preparation.—One pound of coarsely powdered cantharides is subjected to the action of one pound of sulphuric ether and three ounces of acetic ether, in Mohr's apparatus; and the liquid is allowed to percolate the cantharides as long as it is coloured, by which a saturated ethereal solution of cantharides, together with some coloured animal fat, is obtained. In two ounces of this liquid, 25 grs. of gun-cotton are dissolved. This is the easiest method, and can be performed with facility in the laboratory of any apothecary. The process is more complicated and expensive if 20 grs. of pure cantharidin and 25 grs. of gun-cotton be dissolved in one ounce and a half of sulphuric ether and half an ounce of acetic ether.

The *collodium cantharidale* can be preserved without injury in well-closed glasses, and is, for that reason, better adapted than any other vesicant for military hospitals, and for diseases which befall the soldier on his march.

Although the *collodium cantharidale* is much more expensive than the blistering plaster, there is a great saving in its use ; for one drachm and a half of it are equal to half-an-ounce of the latter. Its efficacy has been substantiated by several experiments made by Balbiani and Bosse.—*Pharm Central Blatt.*

ON FERMENT-OILS (*FERMENTOLEA*).

Berzelius observes (*Jahresbericht*, 1848, p. 541), that the generation of ferment-oils is probably much more common than has hitherto been supposed. According to the present experience, such volatile substances are formed in *Centiana Gentaureum*, oak-leaves, various species of plantago, syrup of almonds, *Achillea millefolium*, *Echium vulgare*, *Urtica urens*, *Salix pentandra*, fermenting potatoes, grapes, and grain. If the descriptions of these fermentolea be compared with each other, all these bodies will be found to possess one general character. They are considerably more soluble in water than the common volatile oils; and to judge of the potato-oil, the amyl-alcohol, it may be concluded that they are peculiar kinds of alcohol, which combine with acids and halogens to form compound ethers ; and by this they become of greater interest than they are at present, being only considered as analogous to the volatile oils.

ON AMIDULIN, A MODIFICATION OF STARCH.

BY FR. SCHULZE.

If starch be treated in the same way as for the preparation of dextrin, but the boiling interrupted by sulphuric acid when the starch is dissolved, and the liquid, whilst hot, neutralized by carbonate of lime, after several days flocculi deposit from the perfectly clear liquid, and can easily be separated by filtration. When dry they have the appearance of white sago, and the composition of starch. This substance is called by Schulze *amidulin*. It acts on iodine as starch does, but it differs from starch by its complete solubility in hot water.—*Pharm. Central Blatt*, Jan. 10, 1849.

COMPOSITION FOR TINNING AND ZINKING.

The following compositions, well applied upon cast-iron and iron bars, greatly facilitate, according to Sorel, the tinning and zinking of the same :

1. Ninety-six parts sulphuric-acid of 10° Baumé; and four parts of tin-salt.

2. The same, with an addition of four parts of copper-salt.

3. Three-parts of some copper-salt and ninety-eight parts of diluted muriatic-acid of 15° Baumé.—*Moniteur Industriel.*

DEÏAMBA, OR TOBACCO OF CONGO.

Deïamba, or tobacco of Congo, a new narcotic, is a plant growing wild in the marshy districts of Congo or Zaïre. It is about six or seven feet high, and has long branches, covered with small leaves of about three inches in length. Its flowers are in racemes. These, when dried, are used for smoking, and the smoke soon produces a narcotic effect. The Deïamba is well known to the Portuguese inhabitants of the African coasts, who use it partly as an article of luxury, partly as a medicine.—*Journ. de Pharm.* N.S., xiv., 201.

THE UNREASONABLENESS OF SCIENCE.

An individual named Charles Cameron, a Chemist, has put an advertisement in the *Times*, addressed to the subscribers to the Royal General Annuity Society, soliciting their votes at the next election, on the 30th instant, and also to non-subscribers requesting pecuniary assistance ; for every five shillings on the day of election, would, he says, secure him five votes. The claim of this Mr. Cameron to the consideration of the benevolent rests principally on the circumstance that "he was the first who discovered and made public that splendid light which has long been employed at the Polytechnic for displaying the minute wonders of creation by the opaque microscope, to the gratification and mental improvement of millions." A mighty pretty title this to national gratitude ! The idea of anybody thinking to be rewarded for discovering a new light, or contributing in any way to the enlightenment of his countrymen !

To have the slightest reasonable expectation of a decent annuity, a man ought to have cut an army to pieces, or destroyed a fleet, or burnt an arsenal, or at least blown up a bridge. Not any mischief in the world has Mr. Cameron done, and yet here he comes forward to ask for remuneration! What do we, the British public, care about science, or those who cultivate it ?—what good does it do us to know anything about the minute wonders of creation ?—Talk of the gratification and mental improvement of millions !—The misery and destruction of millions would have been a better recommendation for Mr. Cameron.—*Punch.*

BOOKS RECEIVED.

The Use of the Blow-Pipe *in the Examination of Minerals, Ores, Furnace Products, &c.* By Professor Plattner, Freyberg. Edited, with emendations, by Dr. Sheridan Muspratt. London : Taylor, Walton, and Maberley. 8vo, pp. 401.

The Three Kinds of Cod-Liver Oil *comparatively considered, with reference to their Chemical and Therapeutic Properties.* By L. J. de Jongh, M.D., of the Hague. Translated from the German, with an Appendix by Edward Carey, M.D. London : Taylor, Walton, and Maberley.

TO CORRESPONDENTS.

Mr. Tustin and *Mr. Greenish* will perceive that we have inserted the article to which they allude.

A Chemist (Guildford) directs our attention to a long article on cholera in the *Weekly Dispatch*, by a Physician, containing the following prescription:—Prepared chalk, ℥j; aromatic confection, ℥j; tinct. opium, ℥j; tinct. ginger, ℥ij; tinct. kino, ℥ij; cinnamon water, ℥iij; for which mixture the author says "no Druggist ought to charge a poor man more than 6*d.*" Our correspondent states that a customer brought the prescription to him to be prepared for 6*d.*, and was surprised at hearing the price was three times as much. [The author of the prescription could not have been aware of the cost of the ingredients. In the absence of such information it would have been better to omit the price. Such information, if erroneous, causes dissatisfaction.]

An Old Member.—Blaine's Veterinary Art and *Moreton's Veterinary Pharmacy* are the best works we know on the subject.

A Registered Apprentice.—See vol. vii., No. 7.

Studens.—An apprenticeship is not necessary, provided the candidate has had the requisite practical instruction. The examination must be passed in London. See vol. vii., No. 7.

R. S. H.—In making Emplastrum Plumbi, the water ought not to be allowed all to evaporate, and certainly the Pharmacopœia does not direct that it should. There is no difficulty in obtaining the glycerine from the water that remains, and that in which the plaster is subsequently washed and pulled.

T. A., M.P.S.—There is no particular precaution necessary in crystallising hydrochlorate of quinine. It may be made either by double decomposition with sulphate of quinine and chloride of barium—in which case, of course, it is necessary to be careful that no chloride of barium is left undecomposed—or by direct combination of diluted hydrochloric acid with pure quina, obtained by precipitation with ammonia from the sulphate.

W. W. (Bayford).—We do not think it at all likely that the rains which frequently accompany thunderstorms are caused by the combination of the elements of the water in the air through the influence of electricity.

M. P. S. (Swaffham).—The following formulæ are given in Gray's *Supplement* for *Tinctura Ferri Acetici Ætherea*:—

Pharm. Borussica, 1847.

℞ Solution of acetate of iron, ℥ix.
Rectified spirit (sp. gr. .835) ℥ij.
Acetic ether (sp. gr. .890) ℥j. Mix.

Pharm. Castr. Ruthena, 1840.

℞ Moist and recently precipitated hydrated oxide of iron, 1 part
Acetic acid, 3 parts
Dissolve, and add to nine parts of this,
Acetic ether 1 part
Rectified spirit, 2 parts. Mix.

A Country Member (Alford) is referred to Mr. Samuel Ellis, broker, Fenchurch Street.

Medicus.—Mr. Sage, the successor of Mr. Coxhead, states that the Catalogue alluded to is out of print, and not to be obtained.

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the Editor, 338, Oxford Street, before the 20th of the month (if Answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. IX.—No. IV.—OCTOBER 1st, 1849.

THE SCHOOL OF PHARMACY—SEVENTH SESSION.

From the report of the Professor of Chemistry and Pharmacy to the Council at the close of the last session, it appears that a progressive improvement has taken place in the practical class in the laboratory. The number of entries has increased each session, the course of instruction, by the aid of competent assistants (late pupils in the laboratory), has assumed a complete and regular form, and the result, evinced by the proficiency of the students, has been highly satisfactory. This latter fact has been attested by several of the students themselves, who have acknowledged with gratitude the benefit they have derived from the laboratory, the emancipation from mere Druggists to Chemists in the strict sense of the term, and the facilities which they have acquired for pursuing successfully the business for which they have been educated. A similar advancement in the rising generation in New York is recorded by Dr. Bailey, in his report respecting the prohibition of adulterated and spurious drugs. Alluding to the young Chemists, he observes, "They now begin to discover that a more intimate knowledge of analytical chemistry than has heretofore been generally cultivated, is indispensable to a satisfactory exercise of their responsible functions; and it is truly gratifying to observe, that many are now engaged in perfecting themselves in that important and interesting science with a devotion worthy of all praise."

Reverting to our own school—in the lecture department the report is less satisfactory. The number who attend the lectures bears no proportion to that of the young men residing within a convenient distance of the school, and we fear that many will have occasion to regret their own apathy in neglecting an opportunity of improvement which they would gladly appreciate if they could be induced to give the subject their serious consideration. Much enthusiasm was evinced at the Pharmaceutical School Dinner in July last by some of the late students, who endeavoured to urge their brethren to pursue the course of instruction adopted by the Society, and pointed out, as the result of their own experience, the advantage to be derived from the knowledge thus acquired. The terms of admission to the lectures are so moderate as to form no obstacle to the attendance, as we may remind our young friends that about twenty lectures may be attended for the price of one dinner, and although the excitement may not be so great at the time, the benefit is much more lasting. We advise those who have never attended the lectures to come as visitors for

the first week, and if they should find, at the close of the week, that no interest is awakened in their minds on the subjects treated of, then let them seriously ask themselves whether they have not committed an error in selecting Pharmacy as the pursuit in which they are to occupy themselves in after life?

Materia Medica, as sometimes taught in the lecture-room, is not a very exciting subject; but the substance of Dr. Pereira's lectures, and the animation of his delivery, invest the subject with a new character, and fix the attention of the audience, the dry facts being impressed on the memory by the incidental illustrations which are introduced. Dr. A. T. Thomson has closed his career, and his pupils, especially those who attended his lectures during his prime of vigour, look back with satisfaction at the instruction which they have received from so eminent a professor. It will be no less gratifying to our students to reflect in days to come that they have attended the lectures of Dr. Pereira, who is unrivalled as an authority in Materia Medica, and is a walking encyclopædia always accessible to any of his pupils who may desire information on the subjects comprised in his lectures.

Mr. Redwood, the Professor of Chemistry and Pharmacy, possesses the advantage of many years' experience in the dispensing and manufacturing business prior to the commencement of his duties as a teacher, in which he has been engaged ever since the establishment of the Society. He is therefore practically acquainted with all the requirements of the Pharmaceutical Chemist, and has a facility in imparting knowledge which is of great value to his class.

Mr. Bentley is a rising botanist, a late pupil and the successor of Dr. A. T. Thomson. He is an enthusiast in his subject, and his popularity as a lecturer is established by the fact that he is retained as Professor of Botany at two Metropolitan Hospitals, where his merit is appreciated both by the managers and students. It is also a satisfactory circumstance that one of our professors completed his education at the school where he is now a teacher. We make the observation by way of encouragement to other students who may aspire to a similar advancement at a future time.

The Pharmaceutical Meetings will be resumed as usual, the first being announced for Wednesday evening, the 10th of October. A good attendance on that occasion is desirable, as the first meeting of a session in some degree gives a character to those which are to succeed. Among the subjects to be discussed we may advert to the Sale of Poisons, a subject on which all Chemists are interested, and on which practical opinions are desired. In addition to the usual evening meetings, the Professors of the School propose to deliver a few evening lectures on practical subjects, which will be announced on the cover of this Journal.

THE ADULTERATION OF DRUGS.

Our number for September, 1848, contains some observations on the importation of adulterated or worthless drugs into America, with a copy of an Act passed by the Senate of the United States in June of that year, to put a stop to abuses of this description. Much of the information which had led to the passing of this Act was obtained and published by a select committee, in which Dr. Bailey took a prominent part.

We are now favoured with the Report* of Dr. Bailey, published in the *New York Journal of Medicine*, on the practical operation of the new law. That some benefit has resulted from it, the following extract from the Report will satisfactorily prove :—

The law took effect at this port on the 12th of July, 1848 ; and the following is a list of the more prominent articles of drugs and medicines, with the quantities and place whence imported, annexed, which I have, during the months named, rejected under its provisions : to wit—

July, 1848,	7,581 lbs.	Rhubarb root,	from Canton.
August,	750 lbs.	Opium,	do. Marseilles.
do.	2,940 lbs.	Jalap root	do. Tampico.
do.	2,249 lbs.	Rhubarb root,	do. London.
September,	646 lbs.	do. do.	do. do.
do.	1,414 lbs.	Gamboge,	do. do.
do.	545 lbs.	Rhubarb,	do. Hamburg.
do.	1,400 lbs.	Senna,	do. Leghorn.
do.	2,900 lbs.	Spurious Yellow Bark,	do. Bordeaux.
do.	875 lbs.	Rhubarb,	do. Canton.
do.	758 lbs.	Opium,	do. London.
do.	1,783 oz.	Iodine,	do. do.
do.	1,075 lbs.	Rhubarb,	do. Marseilles.
do.	4,275 lbs.	Jalap,	do. Vera Cruz.
October,	788 lbs.	Rhubarb,	do. London.
do.	227 lbs.	Myrrh,	do. do.
do.	13,120 lbs.	Spurious Yellow Bark,	do. Maracaibo.
do,	1,875 lbs.	do. do. do.	do. Bordeaux.
November,	412 lbs.	Myrrh,	do. London.
do.	1,280 oz.	Iodine,	do. Glasgow.
do.	860 lbs.	Opium,	do. Smyrna.
do.	185 lbs.	Rhubarb,	do. London.
December,	156 lbs.	Opium,	do. do.
do.	1,065 lbs.	Myrrh,	do. do.
do.	12,800 lbs.	Spurious Yellow Bark,	do. Santa Martha.
do.	392 lbs.	Jalap,	do. Vera Cruz.
January, 1849,	1,300 lbs.	Pectoral Paste,	do. San Juan.
do.	2,071 lbs.	Rhubarb,	do. London.
do.	3,550 lbs.	Jalap,	do. Havana.
do.	1,930 lbs.	Spurious Bark,	do. Antwerp.

* *Report on the Practical Operation of the Law relating to the Importation of Adulterated and Spurious Drugs, Medicines, &c.* By M. J. Bailey, M.D., Special Examiner of that class of merchandise in the United States Customs at the Port of New York.—(Read before the New York Academy of Medicine, June 6th, 1849.)

February,	974 lbs.	Rhubarb,	from London.
do.	1,992 oz.	Iodine,	do. do.
March,	1,104 oz.	Croton Oil,	do. do.
do.	4,894 lbs.	Senna,	do. do.
do.	1,345 lbs.	Spurious Bark,	do. do.
do.	404 lbs.	Opium,	do. do.
do.	1,150 lbs.	Valerian root,	do. Paris.
April,	425 lbs.	Opium,	do. London.
do.	1,273 lbs.	Myrrh,	do. do.
do.	550 lbs.	Jalap,	do. Vera Cruz.
do.	816 lbs.	do.	do. Tampico.
do.	1,450 lbs.	Sarsaparilla,	do. do.
do.	600 lbs.	Spurious Bark,	do. Barranquilla.

Together with smaller quantities of various articles which have been rejected from time to time, but which it is not necessary to enumerate here —making the entire amount, some 90,000 lbs. of various drugs, &c., which have, up to the present time, been refused.

This statement relates merely to drugs. Some of the most glaring and infamous frauds which had previously been the subject of complaint and investigation, were in the chemical preparations. In this department, the effect of the law appears to have been no less salutary, as we are told—

No medicinal chemical preparations of any importance have been presented to entry at this port since the law took effect. The agitation of the question for several months prior to the passage of the bill, doubtless had the effect of putting those engaged in the nefarious traffic on their guard ; and as this country was the principal market for merchandise of that description, it is to be presumed that the manufacture abroad has been, in a great measure, discontinued. The worthy popular foreign manufacturing chemists, who have never been known to send out an impure article, look, as far as I can learn, upon the law in question with much favour ; and well they may, for their sales have in consequence greatly increased.

The almost invariable reply of the dealer to any complaints of his customer that articles previously purchased did not prove genuine, as recommended, was, "I am very sorry, but they were just as imported"—leaving it impossible for the purchaser to say whether the truth had been told him or not. The case it now happily otherwise. By the passage of this law that *loop-hole* of escape ("just as imported") is closed, taking it for granted by the way, that the special examiners, at the different ports, do their whole duty.

But we are also informed that the evil, although checked, is not absolutely at an end, for the temptation to practise "home adulterations" is rather increased by the greater purity of the preparations imported, and the large profit consequently attainable by reducing them to the standard formerly passing current in the United States, under the imposing recommendation, "genuine as imported." Dr. Bailey observes,

To suppose that we have none among us engaged, or who *will* engage in the preparation and sale of spurious and adulterated medicines, is to place a higher estimate upon the conscientious scruples of that portion of our speculating and trading community with whom the almighty dollar is paramount to all other considerations, moral, if not divine, than, from my

somewhat extensive observations, I am willing to concede. Even at this early day, the fraudulent work of their hands is but too visible. Within the last month or two, sulphate of quinine in considerable quantities, bearing the label of Rosengarten and Denis, Philadelphia, has been found in market, adulterated to the extent of some twenty or twenty-five per cent. The same may be said of quinine bearing the label of the London Alkaloid Company, London—likewise that bearing the label of Pelletier, Delondre and Lévailant, Paris.

Now, these frauds were perpetrated by our own people, or among our own people, and after the article, too, had come into the hands of the purchaser. The manufacturers sent them forth pure, and had nothing to do with the sophistication. Each of the firms named stand too high, and deservedly so, to warrant even a suspicion of such unpardonable baseness.

The material used for the adulteration of the quinine was found, on analysis, to be *mannite* and *sulphate of barytes*, in about equal weights. The latter article has long been used for this purpose, but not until lately has *mannite* been detected in the sulphate of quinine. It seems to have been ingeniously substituted for salicine, and a somewhat similar substance prepared from the poplar bark; which articles have heretofore been extensively used for like purposes.

The ingenuity consists in the fact, that it is much more difficult to detect the adulterations when effected by the admixture of *mannite*, than when by the admixture of salicine, &c., while the former can be furnished for less than one-fourth of the latter.

The question now very naturally arises, how comes this new method of sophistication, and why has this heretofore foreign practice been recently transferred to our shores? I reply, that I have good reason to believe that we have at present those among us from abroad, who have so long been engaged in this particular line of business, that they have become perfect adepts in this base and deceptive art.

Thus, while a decided check is placed upon the nefarious practices of the foreign fabricator, increased vigilance is requisite in regard to the native dealers, who have no longer the opportunity of throwing the responsibility on the shoulders of foreigners. Dr. Bailey and those engaged with him in the duty of enforcing the law, are fully aware of this circumstance, and measures are in contemplation for extending the efficacy of the law to the suppression of home abuses, so far as it may be found practicable. This applies equally to some of the simple drugs, especially those in the form of powder, where a wide field for ingenuity exists. Dr. Bailey states, in reference to this subject,

I have in my possession the voluntary confessions of a drug-grinder who has retired after amassing a fortune in the business; but I will not swell this report by entering at this time into an extended detail. That duty shall be performed by making it, at some future time, the subject of a chapter in the chronicles of *imperatively demanded* reforms. Suffice it then to say, that most of the *farinaceous* substances, such as rye, corn, wheat, rice, grey sago, &c., &c., together with various colouring agents, are too frequently, if not constantly, to a greater or less extent, brought into requisition—to say nothing of the mixing in the mill of a large portion of the inferior with the good article; as well as the mixing two or more articles entirely dissimilar in their active principles—such a combination, for instance, as crystals of cream of tartar, alum, and whiting!! This last villanous compound, when nicely powdered, is de-

nominated at the mill "grocers' cream of tartar;" but that it is sold and dispensed, particularly in this country, as a genuine article, I have the best of reasons for believing.

We should have been glad if our space had admitted of more copious extracts from the Report, which is extremely interesting, and demonstrates the advantage resulting from a proper inspection of medicinal substances and compounds, with legal powers to prohibit and prevent the sale of such as are known to be adulterated, or in other respects unfit for use. If we had in this country a Board of Health, practically conversant with the duties comprised under the head of Sanitary Regulations, the Americans would not have left us in the background in this very important branch of legislation.

THE CHOLERA.

The additions to the list we have already given, of remedies proposed for cholera, are not numerous. The advocates of calomel continue to maintain their opinion, although divided into two classes, some giving scruple or half-drachm doses, others doses of a grain or two, repeated every ten minutes. The latter is called Dr. Ayre's mode of treatment. We have seen both small and large doses repeated during the early state of collapse with no apparent effect, the vitality of the tissues of the body being so impaired or suspended, and the membrane of the alimentary canal so coated with the serous secretion, as to be incapable of absorbing the remedy. Mr. Howell, of Wandsworth, has used with good effect, in the early stage of purging and vomiting, a solution of nitrate of silver, four grains to the ounce. Of this a tea-spoonful is given every ten minutes until the vomiting has ceased, which is generally the case after the third or fourth dose. Creosote is then useful; and Mr. Howell has found great relief to arise from sponging the body all over with hot turpentine, as a means of producing reaction.

Dr. Hastings recommends bisulphuret of carbon in doses of a minim and a half, in the form of emulsion, with yolk of egg, every ten minutes, until reaction is produced. We are informed that a mixture of charcoal and sulphur in powder has been extensively administered at Plymouth. Mr. Mann, of Clerkenwell, reports favourably of liquor chlorinii, of which he gives 3j. or 3iss., diluted with water, every hour. The Board of Health adhere to the confection of opium, as being useful in the early or premonitory symptoms, though it has been found prejudical during collapse. The medical inspectors acting under the Board differ in opinion in regard to calomel. As a tonic during convalescence the ammonio-tartrate of iron has been used with apparent benefit.

We have been surprised to see numerous letters in the *Times* on the treatment of cholera, purporting to be written by medical men, but utterly worthless, not being authenticated with any name. It is difficult to conceive with what object such articles are inserted in non-medical journals, containing contradictory statements, calculated only to mislead the public and increase the existing panic, by proclaiming, in an exaggerated form, the incongruity of opinion respecting the treatment of the epidemic.—

As an illustration of the mischief arising from such random statements in the public press, we quote from the *Liverpool Courier* the following report of an inquest:

THE ALLEGED PRESCRIPTION OF SIR J. CLARK FOR CHOLERA.

On Tuesday last an inquiry took place before the borough coroner relative to the death of an infant, nineteen months old, the son of William and Elizabeth Dowick, who reside in Blundell Street, Liverpool, and whose death, it was alleged, had been occasioned by having had administered to it a dose of the mixture said to have been prescribed by Sir J. Clark for cholera. The evidence of the child's mother, and of Mrs. Crowther, publican, Blundell Street, was to the effect, that after the medicine had been administered, deceased slept for a length of time, and when he awoke he appeared to be in a fit. He died the same evening about nine o'clock. The dose given was about a tea-spoonful. Mr. John Bold Hyams, Surgeon, of Duke Street, deposed as follows:—The deceased was brought to me between four and five o'clock on Saturday evening last. He was at the time in a state of stupor and very difficult to be roused, and breathed with difficulty. The pupil of the eye was contracted, laboured pulse, and he appeared to be suffering under all the symptoms of narcotic poison. I ordered him resuscitants and everything that might conduce to arouse him from a state of stupor and excite the vital energy. I saw him again some time afterwards, but he continued to sink, and died in my presence between eight and nine o'clock. I am of opinion that death was caused by some narcotic poison. A tea-spoonful of what is called "Sir James Clark's Mixture" would have been quite enough to have caused the death of the deceased. I have examined the printed prescription now produced (the one attributed to Sir J. Clark). A tea-spoonful of the mixture would contain from twenty-six to thirty drops of laudanum. A table-spoonful of it would contain 120 drops, or five grains and a half of solid opium. I consider it a most dangerous prescription—indeed, I may say poisonous. The coroner instructed the jury that, under the circumstances, their verdict must be one of chance medley, which verdict the jury returned, acquitting the mother of the deceased and Mrs. Crowther of all culpability in having administered the mixture to the child. During the progress of the inquiry the coroner sent a request to Mr. Dowling and Dr. Duncan to attend him at his office, and Mr. Dowling having arrived, he (the coroner) remarked that when he had heard of the medicine having been administered under the sanction of the Dock Committee, and knowing its dangerous nature, having had the opinion of three medical gentlemen confirming him in this, he thought it his duty to communicate with Mr. Dowling, and Mr. Dowling would tell them the course which had been adopted. He looked upon the prescription as a most gross and diabolical imposition. Mr. Dowling explained that the medicine, after a consultation of magistrates, had been left at each of the

policc-stations, and he felt bound to say that it had been taken in a number of eases with a good effect; but the moment he heard that Sir J. Clark had repudiated the prescription, he consulted three medical men, and by their recommendation another medicine had been substituted; and he thought the more public the forgery was made known the better, and agreed with the coroner upon the propriety of issuing a placard eautioning the public. The coroner hoped publicity would be given to what had transpired, and that it would be made known that the mixture was a dangerous and deadly poison; and he looked upon the man who had eoncoeted the prescription, and used the name of a talented man to give it currency, as great, if not a greater felon than the murderer of Mrs. Henrichson and her family. It was a gross and diabolieal forgery.—*Liverpool Courier.*

There are good grounds for the opinion that the ordinary autumnal diarrhœa is entirely distinct from the diarrhœa of cholera, and that in the worst cases of cholera there are no premonitory symptoms, the state of collapse coming on almost immediately on the first attack. Nevertheless, diarrhœa of any kind may predispose to cholera, as any debilitating disorder predisposes to epidemics in general. One of the most formidable symptoms of cholera is inaction of the kidneys. If, after the collapse, the kidneys resume their functions, recovery may be anticipated, otherwise the case is hopeless. Many patients are carried off by the consecutive fever several days after the attack of cholera. Sometimes these cases are returned in the register as cholera, sometimes as fever. This is a source of inaccuracy in the statistics, in addition to that which we have already noticed, arising from the confusion of cholera with diarrhœa in some of the reports.

We have been informed that in many cases unusual thirst has been experienced prior to an attack of cholera. This has been noticed in Lambeth, where the parties have aggravated the tendency to disorder by quenching their thirst with "Chadwick's entire," a beverage consisting of liquid guano, flushed into the Thames, and pumped up by the Lambeth water-works "properly diluted" for the use of the inhabitants.

In the hope of arriving at some practical and satisfactory conclusion by the collection of statistical evidence respecting the cholera, the College of Physicians has issued the following circular to the members of the Medical Profession :—

TREATMENT OF CHOLERA.

"*Royal College of Physicians, Pall-Mall East, Sept.* 6, 1849.

"Sir,—The opinions of the profession are divided on many points relating to the pathology and treatment of cholera; and it is not to be expeeted that the doubts and discrepancies existing will be finally settled by the evidenee which any individual member of the profession may adduee. But the committee have a confident hope that valuable and conclusive results, in regard to at least some of the disputed points, might be obtained by eolleeting and eomparing the observations of hospital phy-

sicians and the many other members of the college who have practical experience in the present epidemic.

"Such a method of inquiry appears to be especially applicable, and indeed indispensable, in any endeavour to estimate the relative values of the various modes of treating cholera, respecting which the evidence is at present so conflicting. With the co-operation of the members of the college, the committee may, it is hoped, in some cases, be able to fix the kind and amount of benefit derivable from particular remedies or plans of treatment, and establish the superiority of some remedies, and with regard to others, they may show that their use ought to be at once abandoned.

"The following list includes the principal modes of treatment hitherto recommended. It seems desirable that every member of the college, who has the necessary opportunity, should submit one or more of these to a systematic trial, in a series of cases ; but the committee request that you will communicate to them any observations you may have made on the effects of other remedial means not included in this list :—calomel in large doses, in smaller and frequent doses, calomel with opium, opium in large doses, ammonia, alcoholic liquids, essential oils and aromatics, camphor and musk, acetate of lead, sulphate of copper, the vegetable astringents, quinine, arsenic, iron, the saline plan, as recommended by Dr. Stevens, the tartarized antimony plan, as recommended by Dr. Billing, emetics, the free administration of cold water and ice, the cold bath, and cold *douche*, the application of the 'wet sheet,' injection of saline or other fluids into the veins, bleedings, and electricity.

"With regard to the form in which your observations on the results of treatment may be communicated, the committee would merely suggest, that with a view to the subsequent comparison of the facts contributed by different observers, a statement, not merely of the number of cases treated with each remedy and the main results, but also of some particulars of the cases, is desirable. The following points appear the most important with reference to the object in view :—The age and sex of each patient ; the period of the attack at which the treatment was commenced ; the severity of the attack, as indicated by, 1, the pulse ; 2, the state of the surface, especially of the face and extremities, as to temperature, moisture, and colour; 3, the appearance and amount of the intestinal evacuations; 4, the existence and degree of urgency of the vomiting and cramps ; and 5, the state of the urinary secretion ; the apparent immediate effect of the remedy on the symptoms ; the duration of the state of collapse, whether fatal or not, after the commencement of the treatment, and, in cases of recovery, the supervention or not of the state called the 'consecutive fever.'

"The preceding observations have reference more especially to the treatment of the disease in the stages of impending and complete collapse. But the committee would gladly learn the results of your experience relative to the means of arresting the diarrhœa, which in many instances precedes the state of collapse, and of restoring the healthy action of the kidneys when collapse has been recovered from. [See the Queries No. 6 and 10.]

"Lastly, the committee request that you will communicate with them the results of any inquiries you may have instituted into the morbid anatomy of cholera, or into the chemical and microscopic analysis of the blood and secretions in the different stages of the disease, and any general observations on the pathology of cholera. The series of Queries appended to this letter embraces some of the more important questions which might be elucidated by the combined experience of the members of the college. But it is not desired by the committee that in any communication with which you may favour them you should limit your remarks to the subjects of those queries.

QUERIES.

"1. Can you communicate to the committee any facts observed or investigated by yourself which appear to you demonstrative of the contagious or infectious nature of cholera, or of its communicability in any way?

"2. Can you detail any facts illustrative of the influence of deficient ventilation, damp, and foul air respectively, or of other external circumstances, in determining or favouring the production of cholera?

"3. What are the particular states of body or mind which, according to your experience, have most frequently predisposed individuals to be attacked by the disease?

"4. What are the groups of symptoms which have preceded the full development of the attack of cholera?

"5. Have you observed any distinctive marks by which diarrhœa about to pass into developed cholera may be recognised?

"6. Does it accord with your experience that cholera, in the stage of serous diarrhœa, may with certainty be checked? What means have you found most effectual in attaining this object?

"7. Have you any facts come under your notice which, independently of the theoretical views, would elucidate the question, whether the affection of the intestinal mucous membrane in cholera is the primary disease or one of its secondary effects?

"8. Can you furnish the committee with the particulars of cases in which the rapidity of the fatal collapse has born no relation to the amount of fluid discharged from the blood-vessels, either through the intestinal mucous membrane or through the skin?

"9. What are the pathological conditions which you have observed in the consecutive fever?

"10. What means have you found most successful in exciting the functions of the kidneys after the stage of collapse has passed?"

The only circumstance to be regretted in regard to this circular is the late period of its appearance. The questions are calculated to direct the attention of medical practitioners to the most important subjects for inquiry, and the suggestions, although valuable at any time, would have been doubly so at the commencement of the epidemic, as a means of promoting a methodical and systematic investigation throughout, instead of trusting to the chance of the desired information being already recorded. Evidence at the present time is liable to fallacy, as it is well known that at the close of an epidemic the cases are much less severe and more amenable to treatment. Consequently, the remedies last in the field are likely to gain an undue share of credit.

The College of Physicians, as the most important medical body in the kingdom, might be expected to take the lead in an investigation of this description; and, although superseded by a non-medical Board of Health, the College is looked up to by the public as the highest authority in medicine. An idea has prevailed during the prevalence of the epidemic that the physicians, in their corporate capacity, had done little or nothing in reference to the cholera to sustain their character as guardians of the public health. We stated in a former number that a Cholera Committee

was appointed by the College, and have been anxiously looking out for some demonstration of the fact that the subject was under consideration. This is furnished by the above circular; and if the profession generally should respond to the appeal, a voluminous and important mass of evidence may be anticipated, the deductions from which ought to throw some light on the subject.

THE BOARD OF HEALTH AND THE PARISH AUTHORITIES.

The Board of Health has had a difficult task to perform. The field of its operations is the empire, and its office is to superintend all the parish authorities; its powers, although nominally absolute, have proved in practice to be absolutely nominal. The attempt on the part of three or four individuals, armed with a toothless Act of Parliament to coerce into instant allegiance so powerful an array of local oligarchies, was an indication of excess of valour over discretion. Even under favourable circumstances this would have been a delicate undertaking, requiring much tact and judgment, with conciliatory measures backed by moral influence. By such means, a Board properly constituted, possessing practical and professional experience, and acting with becoming dignity, might have carried weight with local Boards, whom it is more easy to lead than to drive.

The appointment of a remarkably unpopular ex-poor-law commissioner as one of the members of the Board of Health was unfortunate, and calculated to weaken the moral influence of the Board with those who had already been sufficiently goaded under his lash. As well might a slave-driver attempt to conciliate and keep in harmonious allegiance the emancipated negroes.

The Board thus constituted gained nothing by its dictatorial and arbitrary tone, assumed with an idea of enforcing obedience, but calculated rather to cause mutiny; and some of the emissaries of the Board, acting on the same principle, have found "the insolence of office" equally inoperative as a means of commanding respect. Consequently, the Board of Health, instead of coming forth as the guardians of the public in sanitary matters, have commenced their career by an antagonistic movement against the constituted authorities of the several parishes. In the metropolis, the proceedings have been ludicrous in the extreme; and we believe every parish has resisted the orders issued as being either impracticable, uncalled for, or inapplicable to the requirements of the locality. This unanimity would not exist without some cause. The Board of Health is not satisfied with ascertaining that proper measures have been adopted, or giving instructions as to any defect that may be found to exist, but in every case, irrespective of what has been done, a stereotyped order is issued in legal form, and this order, if not instantly obeyed to the letter, is followed by a threat of legal proceedings.

In the city of London, the guardians had used the utmost diligence in providing for the wants of the poor under the emergency of the epidemic. They had appointed additional medical officers, and provided medicine, issued handbills stating where application should be made, inspected the localities requiring especial attention, and made

provision for the accommodation of patients. The Board of Health issued a peremptory order, which the guardians duly considered, and passed a resolution, recapitulating what they had done, objecting to the general house-to-house visitation, as being calculated to create a panic and do more harm than good, and declaring that "they had already practically carried into effect the chief portion of the order in a manner more acceptable to the inhabitants of the union, and more congenial to the feelings of the poor." The result of this resolution was a summons to appear before the Lord Mayor: between eighty and ninety of the guardians attended, and the case was argued at some length. The allegation was not the inefficiency of the measures adopted by the guardians, but the crime of setting up their judgment against that of the Board of Health. The bench strongly urged a compromise, on the ground that a decision on either side would be productive of serious consequences as a precedent. This was declined by Mr. Clarkson on behalf of the guardians, and the case was adjourned. In St. Pancras, St. Saviour's, and St. Ann's, Bloomsbury, similar altercations have taken place, the Board of Health having shown a formidable set of teeth without getting a bite. At the Greenwich Court, the Board applied for summonses against the guardians for non-compliance with orders, and the application was refused. We understand the orders have subsequently been virtually carried out.

In Marylebone the, Board of Health ordered the house-to-house visitation by two medical men, to be specially appointed for the purpose; also a house or houses of refuge to be hired for the families and neighbours of patients. The guardians had already appointed seven extra medical men, made all requisite provision for the reception of patients and necessitous persons, and appointed a committee to sit daily and receive the reports of the surveyors, inspectors, and other officers. Every emergency was provided for: but the general house-to-house visitation by two strange medical men was deprecated as injurious and unnecessary. Legal proceedings were threatened verbally by the solicitor of the Board of Health, who, in conversation, displayed entire ignorance of the circumstances of the parish and the law under which the guardians are appointed. The guardians, in reply to a threatening letter, simply stated that they had far exceeded the order by the arrangements already made. The Board of Health then assumed a tone rather more conciliatory, and deputed one of their medical inspectors to confer with the Board of Guardians on the subject of the measures adopted. This gentleman was informed, that instead of two extra medical men as ordered, the Board had appointed seven, besides their efficient staff of inspectors and surveyors, and a committee of their own body, who sat daily to receive the reports on all matters relating to the public health; that instead of taking a house of refuge, the Board had provided temporary accommodation, when requisite, in the workhouse, or in lodgings; and that the epidemic had so far subsided that there was not a case of cholera under treatment, and very few of diarrhœa. This, he said, was satisfactory as far as it went, but it appeared that the Board had not adopted the house-to-house visitation in the manner directed. He was told that it had been done to such an extent as occasion required; that the task of visiting every house as proposed, in a population of 160,000,

could not be performed by fifty medical men. He replied, that as the disorder was declining, twenty might probably be sufficient, but in the mean time he should be satisfied by the appointment of seven in addition to the ten already engaged to visit the poor! He added emphatically, "Having no cholera, now is the time to organise your staff, and when the disorder comes again, as it most likely will, you will be prepared. The expense in a parish like this is surely no object in a matter of such importance." The Guardians were astonished. We mention this case as an illustration of the dilemma in which Boards of Guardians are placed when expected to serve two masters—their constituents, to whom they must render an account, and the Board of Health, who, regardless of expense, order them to create sinecures on speculation.

These proceedings are not confined to the metropolis. The *Liverpool Mercury* contains a report of a special vestry meeting summoned to receive the report of a Committee which had been appointed to consider certain charges brought against the vestry by the Board of Health. From this report, which is very voluminous, it appears that the parish authorities had been most energetic in their exertions to provide for the wants of the poor under any possible emergency. They had established dispensaries, elected medical officers, and appointed committees to sit daily when needful; they had hired a house of refuge, which, not being wanted for that purpose, had been used as an hospital (a serious offence in the opinion of the Board of Health, houses of refuge being one of their crotchets). In short, on reviewing the history of their proceedings from the beginning, as detailed in the report, any impartial observer must be struck with the activity and zeal of the vestry and their agents. Yet they are accused by the Board of Health of "neglecting the discharge of their duties for at least a period of two months, in spite of repeated warnings," &c., with sundry other charges more or less frivolous and imaginative. In reference to the nature of the attack, we quote the following from the reply of the committee:—

"They next indulge in some sentimentality, and upon their perverted statements they found an argument for additional powers; respecting which we have to observe, that the only evidence showing the necessity for such powers, arises from the fact, that a body which can, either from carelessness or any other cause, publish a misrepresentation, such as is their report of the conduct of another public body, is not likely to exercise much moral influence."

Mr. Abraham, who moved the adoption of the report of the Committee, "attributed the charges which the Board of Health had made to the manner in which the vestry had received Mr. Grainger during his visit to Liverpool. They certainly did not receive him with much courtesy; and the Board of Health seemed to be offended at it, and feeling their own inefficiency, had made charges against the select vestry of Liverpool, with very little scruple, and without much regard to facts."

This is not the only instance in which a discourteous attack on the part of the Board of Health may be traced to a personal source in reference to one of its agents.

It is needless to recount further examples of the adverse collision

of the Board of Health with parish authorities, the obstruction of public business by such proceedings—the indignities offered to independent and honest men, labouring gratuitously for the benefit of their fellow-parishioners, and roused into indignation by inspectors deputed by the "guardians of the public health" to throw the apple of discord in every parish in the kingdom.

The College of Physicians, whose authority in reference to the Pharmacopœia is absolute and undisputed, order certain preparations, and give the processes, but state, at the same time, that the result is the primary object; and that if the same result can be obtained by any other process they are equally satisfied. With the Board of Health the result appears to be a secondary consideration, the primary object being to obtain despotic sway by enforcing rigidly their instructions, not only as to what is to be done, but as to the manner of performing it. The *dictum* is, "You may have done five times as much as we ordered, but you have done it in your way—we require you to do it in our way."

We must, however, give the Board of Health due credit, and freely admit that it has done some service by putting the local boards upon their metal, thus causing them to act more promptly and efficiently than they would otherwise have done. The same credit is due to the Cholera, which has been the means of drawing the attention of the public to various nuisances and their consequent removal.

A properly constituted Board of Health would be a benefit to the public. Of such a Board medical men should constitute the majority, and these should be selected from among the highest authorities in the profession. The other members should be practical men of unblemished reputation, incapable of jobbing. Instead of this, we have a Board composed of noble lords and place-makers, the aristocratic influence being neutralised by the under current of the wheel-within-wheel policy. This non-medical Board employs medical men as inspectors and slave-drivers, and by officiously interfering in local matters of detail, respecting which they display consummate ignorance and imbecility, the public weal is sacrificed, the time is wasted, and the Board of Health, instead of commanding respect and enjoying the confidence of the public, is deservedly stigmatised among the parish authorities as the In-sanitary Board.

THE ABATEMENT OF NUISANCES.

The visitation of the cholera has indirectly been instrumental in producing much public benefit, by making imperative that attention to sanitary measures which, in the absence of some direct stimulus, are too often neglected. Among the most serious evils likely to be removed in consequence, may be mentioned that of intramural interments, on which subject some of the most disgusting details have recently been published. The Board of Health has very properly interfered in checking this glaring nuisance. The practice of burying a dozen or twenty paupers in a large hole, as noticed in our last number, has been prohibited, and, we believe, generally discontinued. Orders have also been given by the Board of Health to close some burial-grounds immediately. In some cases the parish authorities have resisted this order, on the ground that there was no necessity

for so sweeping a measure, and that the requisite reform might be introduced without closing private vaults or well-constructed graves, from which no nuisance arises. This has been a source of litigation. A modified order might have been more politic under existing circumstances, as it is obvious that reforms of this description can be more effectually and satisfactorily carried out when all parties are co-operating amicably, than when a movement, which ought to be a simultaneous public benefit, resolves itself into a trial of strength.

The general cleansing of dwellings has also claimed especial attention: and the supply of pure water is a subject on which much excitement prevails. On this question and that of drainage, with which it has become more intimately connected in consequence of the flushing of sewers into the Thames, several public meetings have been held. The proceedings of the Commissioners of Sewers have become so notorious, that it appears impossible that affairs can continue much longer in their present position. The following able comments from the *Times* of Sept. 21, are worthy of attention:—

The report of yesterday's proceedings at the Court of Sewers, which will be found in another column, contributes another page to the long and shameful record of ignorance, imbecility, and confusion which the annals of the present Commission have already furnished. Posterity will be at a loss whether to admire most the indifference of a public, or the recklessness of a Government, which could have delegated by far the most important work which this century has conceived—a work upon which the credit of the whole nation is at stake, and in which the health and happiness of millions are involved—to the management of a committee, the leading member of which knows far less about the subject than the humblest bricklayer employed in the service.

Only conceive a man undertaking to build a house, beginning from the roof downwards! Conceive an engineer proceeding to erect a water-wheel without ever troubling himself about a supply of water, or the means of discharging it! Conceive, if possible, a human being, provided with a stomach and the proper organs of digestion—only destitute of the usual channels by which the stomach is emptied and replenished! Such, and many similar comparisons force themselves upon the mind when listening to one of Mr. Chadwick's expositions of his ideas of drainage. Active and restless as his imagination appears to be, it never wanders beyond the sphere of blocks of forty or fifty houses and four-inch pipes. Does he really consider it so great a triumph to have cleansed an Augean stable in Westminster of 450 cartloads of refuse and corruption? Does he make it his boast that he has purified the Cloisters from stench, and preserved Westminster School from the ravages of cholera? If this be all, let him have due credit for the Herculean exploit. But is it all? What has Mr. Chadwick done with his 450 cartloads of filth? Has he sent them to fertilise the fields of Kent or Essex?—or, if not available for such purposes, has he taken care that at least they shall not contaminate the atmosphere in the neighbouring districts? No; he has sent them into the river, that the whole metropolis may share his favours, and that the poison which is ejected from Westminster may circulate with freedom throughout Lambeth and Southwark.

In all that Mr. Chadwick has done he has simply relieved one locality at the expense of others. His system of house-draining without a supply of water, of flushing his sewers into the Thames, and of laying down his capillaries or house-drains without providing or even considering his outfall, exhibits an ignorance of the first principles of drainage, of which any mole or rat—those practical workmen—would be ashamed.

It is really high time that the Government should interfere and put an end to these absurdities. We observe that Mr. John Bullar threatened that, in the event of Mr. Leslie persisting in his motion to abolish the Trial of Works Committee, he should move, as an amendment, that the Commission itself should be dissolved. We think the suggestion an excellent one; and hope it may be adopted in time to prevent the Commission from poisoning the Thames at Kingston and Richmond, as they have done at Westminster and Blackfriars.

THE SALE OF POISONS.

In consequence of the numerous cases of secret poisoning which have lately become public, a variety of plans have been suggested with a view of placing some check upon this destructive crime. The evil is one which demands serious attention, and every practicable means should be adopted for the purpose of protecting the public against an insidious crime which is a disgrace to human nature.

We are not prepared to admit, as a necessary deduction, that because numerous cases have been detected, therefore the crime is on the increase, nor do we concur in the inference that the evil may be attributed to the unrestrained sale of arsenic, *because*, in most of the cases made public, arsenic has been the agent. The advanced state of science has brought to light many facts which might otherwise have remained in obscurity; and the public press, in making known these facts, with all their horrible details, has furnished practical information for future criminals, with theoretical propositions for the suppression of a contagious propensity.

Viewing the subject practically, we find that the crime of secret poisoning existed among the ancient Greeks and Romans, and prevailed to a serious extent in France and Italy in the seventeenth century. It is supposed that the poisons chiefly employed at that period for the purpose were of vegetable origin. By some persons arsenical preparations were used; and we are told that at one time the sale of aqua-fortis was forbidden at Rome under the idea that it was a principal ingredient in some of these secret compounds. History records the names of numerous persons who carried on the profession of getting rid of inconvenient relations, to an extent which, in some localities, became so alarming, that those who participated in the crime lived in constant terror lest they should be the next victims. We are not aware that the practice was ever carried on in this country so systematically as it has been in France and Italy, yet the existence of the propensity is sufficiently proved by the accumulation of isolated cases.

These being the facts with regard to the depravity of human nature, both past and present, the question to be solved is, what legal means can be adopted to restrain the deliberate murderer from this secret and cowardly method of effecting the object? We proceed to consider the proposal emanating from the Provincial Medical and Surgical Association, embodied in a Petition about to be presented to Parliament, the substance of which is as follows:—

"1. That no Druggist or shopkeeper be allowed to sell arsenic without a licence, under a penalty.

"2. That no person be allowed to sell small quantities of arsenic unless combined with some material, the administration of which with food would be at once detected by the appearance or taste.

"3. That no person be allowed to purchase arsenic unless accompanied with a witness.

"4. And that the vendor do keep a book, in which he should make an entry of every sale of arsenic, to which the purchaser and his witness should affix their names and places of abode, and that this should be attested by the vendor."

In support of this proposed enactment, it is stated that "more than one-third of the fatal cases of poisoning in England are occasioned by arsenic; and that in the years 1837-8 there were 185 such cases." Dr. Tunstall, of Bath, who has published a pamphlet on the subject, observes, "that the purposes for which arsenic is usually purchased, are: 1st, to poison rats and other vermin; 2d, for sheep-dressing; 3d, for steeping corn." He proceeds to point out that for the first of these purposes arsenic is unnecessary, and that its sale by retail under such pretexts is fraught with danger—that for sheep-dressing the arsenic may be sold in combination with soap and other ingredients, or applied by the vendor to the sheep—and that for steeping corn, sulphate of copper answers better. These latter statements we shall not call in question, nor do we deny that the four propositions above quoted might produce some effect in preventing accidental poisoning, but as a restraint upon the criminal, we fear they would be inoperative.

First, with regard to the licence. By what rule, and to whom would the licence be granted?—how often would it be renewed?—in what manner would it operate? It may be presumed that every Apothecary and Druggist would have a licence, as well as some wholesale dealers, oil and colourmen, and farriers. Without going any further, how many thousand licences would be required to supply this demand? and what would be the result of all this parade? We are inclined to suspect that it would be similar to that which occurs when a quack is prosecuted; namely, he becomes notorious, and his business increases three or four-fold. We also think the introduction of a licence would be a *direct* permission to sell arsenic, and the precautions to be taken being also laid down by the propositions 2, 3, and 4, those who complied with these regulations would be free from legal responsibility. Dr. Tunstall gives us an idea what would be the result of this arrangement by stating a case in point. Alluding to Mrs. Marchant, who poisoned her husband, buried him on the Saturday and married again on the Monday, he observes that "she took her witness, fulfilled all the requirements of the Druggist who supplied her with the 'penn'orth of arsenic for rat poison,' unblushingly answered his questions, and unflinchingly repeated the dose of the drug which failed at first in the results she expected." The doctor argues, "had she not married so soon and so indecorously, would she not have been pitied for her untimely widowhood? and might not her crime have been committed with impunity?" Now, if the proposed law had been in force the only difference would have been that the arsenic would have been "combined with some material the administration of which, with food, would be at once detected by the appearance or taste." To get rid of this material she would have had the trouble of washing her arsenic and pouring off the water from the sediment. If it be said that this expedient would not occur to ordinary criminals, we reply, the newspapers would soon teach them how to

cleanse their arsenic, as the reports of inquests in these cases are in effect a series of lectures on secret poisoning, and the sale of disguised arsenic being directly legalised under licence, the criminal could obtain it without exciting suspicion, and make it "fit for use" at leisure. The only precaution necessary to prevent detection would be not to marry again too soon.

Even on the supposition that the proposed law would in some cases prevent the purchase of arsenic for criminal purposes, we are not sure that it would prevent poisoning. If Rebecca Smith, who confessed that she had poisoned eight children, had used "child's cordial" instead of arsenic, she might at this moment have been poisoning the ninth. Of all poisons there is none so dangerous to the criminal as arsenic. Even time does not baffle the Chemist in the detection of the poison. If only a suspicion exist, the proof is at hand. We are told that "more than one-third of the fatal cases of poisoning in England are occasioned by arsenic." On what evidence does this assertion rest? Simply on the fact that arsenic is easily detected. How many persons have been poisoned by other means beyond the reach of chemical detection it is impossible to conjecture. We readily admit that if any means could be contrived for preventing the use of arsenic, as a family poison, the cases of *detection* would be greatly reduced in number: whether the cases of *poisoning* would diminish in the same ratio, is a distinct question. On this point, fear preponderates over hope.

In the above proposals, the Association have confined their attention to arsenic, considering this the great and principal evil, and fearing that a general denunciation of poisons would be met by the *argumentum ad absurdum*, on the ground that almost all medicines would come under the definition. The queries of Dr. Tunstall,* in another part of this number, are intended to elicit practical information on the subject. It is obvious, from the tenor of these queries, that the opposition of Chemists on commercial grounds is apprehended. This notion we feel persuaded is fallacious. The sale of arsenic by retail is commercially a matter of no importance to the Chemist. Many refuse to sell it altogether, and it is policy to do so. The profit of a few pence in the year is utterly insignificant compared with the risk of accident, and the unenviable notoriety of a coroner's inquest.

The ground upon which we object to the plan proposed is, that as a means of checking the sale of arsenic it would be quite inoperative. The positive permission conveyed by the licence would rather facilitate than obstruct the purchase. The discussion of the new law would give publicity to the facts relating to criminal poisoning, with all the expedients requisite to prevent detection, and this, supposing the law to be inadequate to the purpose intended, would produce a bad effect on the minds of those who ought to be kept as much as possible in ignorance on the subject.

Although we cannot agree in opinion with the authors of the proposed law in regard to its probable efficacy, we fully participate in their desire to check the glaring evil of family poisoning by every practicable means, and consider the subject a very proper one for discussion at one of the Pharmaceutical meetings.

One view of the question strikes us as being remarkably comic,

* Page 176.

namely, that while, according to the law of the land, any person who may think proper to place a coloured bottle in his window may, *de facto*, become a Chemist and Druggist; and every such Chemist and Druggist may sell without restraint every kind of poison to every man, woman, or child who applies for the same, one poison in particular is singled out as the subject of a special prohibition! Accidental poisoning is overlooked, the education and examination of those who deal in poisons is deemed a matter of no moment, and opium, aconite, lobelia, hemlock, and nightshade, with a thousand other deadly drugs, may be sold without restraint by ignorant persons, provided always that a prohibition is placed on the sale of arsenic by granting a licence to sell it!

This appears to us to be commencing legislation at the wrong end.

THE MODE OF PUFFING QUACK MEDICINES.

In puffing a quack medicine into notoriety, those who understand the business pursue a regular system. In the first instance, the "discovery" is ushered in by a series of advertisements describing the "boon offered to the public;" then a few testimonials are added, and all the newspapers, London and Provincial, are supplied with this information: specimens of the article being sent to the several editors, with a request that a "notice" may be inserted on the strength of the "wholesale" order for advertisements. At least £1000 must be expended in this way, not to mention the chalking of walls, circulation of handbills, and placarding of vans, before an impression can be made on the public mind likely to produce a remunerative return. This being done—the "boon to the public" having got a name, it must have a "clencher." For this purpose an affidavit is sworn before the Lord Mayor by an agent or patron of the discoverer, setting forth the wonderful efficacy of the specific in the case of witness or of some of his acquaintance. This proceeding may be called the "great gun" of the process, and is followed by another volley of artillery in the form of advertisements, in which a copy of the affidavit is conspicuous. Sometimes the names of great authorities in medicine are ingeniously interwoven in the advertisement, who, headed by the Lord Mayor, give apparent weight and consequence to the fortunate discoverer and his "boon."

An affidavit, stating that a person who has had a running in his leg of fifteen years' standing, which has baffled the skill of all the faculty, until an eminent physician advised him to try Holloway's ointment, when the running came to a full stop, after rubbing in three pots, price 1*s.* 1½*d.* each—is an announcement which is naturally received by the public as a "great fact," and those who have a running in their legs run to the emporium to stop it. It matters not whether a pot of ointment is advertised "to restore sight to the blind," or a box of wafers to restore lungs to a patient dying of consumption; however extravagant the statement, there are persons credulous enough to believe it, especially if it has been sworn before the Lord Mayor.

In this manner the public are gulled, the profession insulted, and the Mansion-house becomes an arena for the encouragement of quackery. Further sanction is given to the system by its occasional adoption by persons of respectable station, whose example is con-

sidered a justification of the employment of similar means to attain notoriety.

A recent number of the *Times* contained the report of a statement made before the Lord Mayor respecting chloride of zinc as a disinfecting agent, which is as follows :—

"Lieutenant Jackson presented his Lordship with two series of reports on the effects of the disinfecting fluid of Sir William Burnett, Director-General of the Medical Department of the Navy, which were published by order of the Lords Commissioners of the Admiralty, together with a vast number of corroborative statements as testimonials of indisputable weight to the efficacy of chloride of zinc in the destruction of deleterious miasma and the extinction of the causes of epidemic disease. Amongst a great variety of instances alluded to were the following :—In a house in St. Andrew-street, Plymouth, occupied by fifty-two persons, where the cholera had made its appearance, the chloride was used for the purpose of attempting to purify the place. It was sprinkled about every room except four, in which the occupants would not permit it to be applied ; the result of which was, that in those parts of the house where it had been used not a single case of cholera has occurred, while in the four rooms alluded to the disease still existed, and some deaths had taken place. There were numerous cases of a similar kind in the same town, and so convinced were the medical gentlemen who had charge of the cholera hospital there of the utility of the chloride, that, on their recommendation, the Plymouth Board of Health had ordered a large supply from London for the use of that establishment. One of the principal surgeons spoke of the fluid in the following manner :—'I am thankful to say I have found its use of the utmost importance in almost magically dissipating the unwholesome and offensive smells arising both from the external and internal excretions and exhalations of the human body suffering from cholera. Its good effects were not only observable upon those already attacked with disease, but in checking a further spread of this fearful malady among those in attendance and about the sick, and I have no hesitation in bearing testimony that many valuable lives have been spared by its use which otherwise would have fallen a sacrifice. Since the 18th ult. I have had under my care nearly 400 cases of cholera and cholera diarrhœa, many of which were strongly marked by symptoms of extreme virulence and malignity. However, I am rejoiced to say that only sixteen of that number have fallen victims to the disease.'"

In former numbers of this Journal* we have discussed the merits of chloride of zinc, and other agents recommended as disinfectants, or deodorisers, pointing out the distinction between these two properties, and also the *rationale* of the chemical decompositions on which the efficacy of the several compounds is supposed to be founded. From the investigation then made, we arrived at the opinion that the evidence adduced was by no means conclusive, being liable to fallacy, and in many cases contradictory. The doubts are increased by the fact, that the experiments and reports partake rather of the commercial than scientific character, and that the assumed results are adapted by each party to his own theory. In matters of this kind the object in view is or ought to be the truth ; and much harm is sometimes done by over-estimating the virtues of a medicinal agent, thus giving rise to temporary enthusiasm followed by corresponding disappointment.

* Vol. vii., pp. 60 and 107. Vol. viii., p. 55.

Nothing is more easy than to prepare statements of this kind, wearing the semblance of truth, and yet calculated to give a very erroneous impression. Mr. Ledoyen gave an equally flourishing account of his fluid, apparently founded on evidence, the fallacy of which we exposed at the time. After he had received £1000 from the Government for his foolish expedition to Canada, where his partner died of the fever he was deputed to cure, and he himself narrowly escaped, the *furor* for his magic fluid subsided and sank with the inventor into oblivion.

We now see a lieutenant (we presume in Her Majesty's Navy) resorting to similar expedients, and following in the course usually adopted by the vendors of quack medicines. He is, we suppose, not the principal in the matter, but the agent; not we hope and believe of Sir William Burnett, the Director-General of Her Majesty's Naval Hospitals and Fleets, but of some company or persons who have purchased or hired of this eminent physician the right to use his supposed discovery and name. The chalkng of walls and the advertising vans were not required in this case, the Admiralty and the Mansion-house having been the vehicles for advertisements. From the statement in the above deposition it might be inferred that the rooms in St. Andrew Street were in precisely the same condition, except that in four of them the chloride of zinc was not used. It is more than probable that persons who would resist so inoffensive an experiment were obstinate in other respects, and might have an equal antipathy to soap and water and sanitary measures in general. We can scarcely suppose that the surgeon who only lost sixteen out of 400 cases attributes his success to chloride of zinc; yet the statement is introduced in such a manner as to convey that idea to persons unacquainted with the subject. If, however, he really does ascribe it to the chloride, we can only say that we regard him as offering a happy analogy to the countryman who purchased of a Florentine quack six pills, which were to enable him to discover his lost donkey. The pills beginning to operate on his road home, obliged him to retire into a wood, where he found his donkey; in consequence of which the clown spread a report of the wonderful success of the empiric, who no doubt reaped an ample reward from the proprietors of strayed cattle.

There is this essential difference between the "disinfecting" properties of chloride of zinc and those of the so-called chloride of lime (hypochlorite of lime): the former, both in the solid state and in solution, is fixed at ordinary temperatures, gives out no vapour, and is, therefore, odourless; the latter liberates free chlorine, which diffuses itself through the air. In the former case the "stink" must be taken to the liquid: in the latter, the vapour of the liquid goes to the "stink." The superiority of chloride of zinc consists in this: Chloride of lime is so cheap that it is not worth selling. Chloride of zinc is 2*s.* 6*d.* or 3*s.* 6*d.* a bottle, which is an important advantage to the patentee, or his agents; but not so to Boards of Guardians and other persons who desire to neutralise effluvia at a cheap rate. If, however, an inodorous metallic salt be preferred to the odorous chloride of lime, better, cheaper, and more easily procurable deodorisers may be employed than chloride of zinc, namely, sugar of lead, or the subacetate of lead, or sulphates of copper and iron.

Our readers must receive with great caution all statements emanat-

ing from the agents of the parties interested in the sale of chloride of zinc. When the foundation of the Royal Exchange was about to be laid, some of these agents suggested the use of a solution of chloride of zinc to preserve the timbers. It was stated that this fluid possessed the advantage of not acting upon iron nails, whereas some other fluids used for preserving wood did. In proof of the assertion an experiment was arranged, the several fluids being placed in glasses, into each of which a piece of iron was immersed. A friend of ours, who went to see the result, was surprised to observe that the chloride of zinc solution was clear and the metal bright; while the other fluids were turbid with deposit, and the metal contained in them much corroded. On inquiry, however, it was discovered that the glass containing that solution had been emptied, cleaned, and replenished the same morning; while the other glasses had remained undisturbed for many days! Of course the timbers were not "Burnetized."

After this circumstance we have received with some degree of doubt the reports in reference to this fluid, for while we cannot for a moment suppose that Sir W. Burnett is cognizant of, or implicated in, any artifices of this kind, we have less faith in the *accuracy* of his agents and trumpeters, even though their depositions may be made at the Mansion-house before the Lord Mayor.

A DAYLIGHT DRUGGIST.

This is a new variety of the *genus* Chemist and Druggist, introduced to notice by a correspondent in a recent number of the *Lancet*. We omit the names, as we always, in alluding to subjects of this kind, deal with principles rather than individuals, and our object on the present occasion is to draw attention to one of the responsible duties of the dispensing Chemist, which we consider very important, especially at the present time:—

"I was called a few evenings since, at a late hour, to visit a patient suffering from a severe attack of dysentery, at any time calculated to excite alarm, but especially so just now, from its resemblance to cholera, for which, indeed, in the present instance, it was mistaken by the other members of the household. I was therefore anxious, both on account of the urgency of the case, and their anxiety, to administer an immediate remedy, and went for this purpose, being a considerable distance from home, to the nearest druggist, who happened to be * * * * * * * * * * It was about a quarter to twelve, and after my ringing several times, he made his appearance at an upper window, and demanded who I was, and what I wanted? I replied that I was a medical man, and wanted some medicine for a patient dangerously ill. You will hardly believe, Sir, that he had the inhumanity to deny me; but I assure you his reply was, that 'he was gone to bed, and could not come down to me.'

"I could not of course suffer such conduct to pass unnoticed, and therefore called the following morning, and remonstrated with him, hoping to convince him, not only of its impropriety, but of the positive danger to himself as well as the patient, of refusing medicine under such circumstances. You will judge of my success by his replies, which I give you as nearly *verbatim* as possible, omitting my own remarks for the sake of brevity. 'He was certainly at liberty to do as he pleased, and was not under any obligation to go down to any medical man who chose to go there after he had gone to bed.' Again: 'Medical men, when called out late,

ought to provide themselves with something or other with which to make shift until morning.' And again: 'He did not see why he should be called upon to *peril his health* by going down into his shop at night, and he should not do it."

We have occasionally heard of the difficulty of rousing a weary Druggist from his slumbers in the night, and know by experience how great an effort is sometimes required in obeying the unwelcome summons. In fact, none but those who have lived under the thraldom of the *night-bell* can form a correct idea of the sensations its sound produces in the midst of a dream. After a long day of sixteen or seventeen hours close application to his responsible duties, without intermission save the three short half-hours of meal-times, the Chemist, with scarcely strength to light his candle, drags his weary limbs up stairs, and, without the aid of morphia, is soon asleep. The scene has changed; reality has given place to a tranquil dream, which is disjointed by the jarring of the bell-wire, the result of pull the first. Pull the second produces a peal which acts like an electric shock, and he jumps out of bed. One leg is scarcely in his trousers when peal the third makes him vibrate from head to foot. He lights his candle and hastens to the door, just in time to hear, at the lower extremity, the jerk of pull the fourth. Then comes the prescription—mixture, pills, and, per chance, a blister. The gas is lighted, the prescription prepared, the customer gone, and once more the Chemist is asleep. Again the night-bell sounds, again he hastens down stairs and opens the door, but finds no customer—it was a "runaway ring."

These are the casualties to which the Chemist is exposed; his constitution impaired by incessant application; his rest broken at uncertain intervals. Some extenuation may, therefore, be pleaded on his behalf if he should happen on an occasion to sleep on in spite of the night-bell, as sailors have been known, when overcome by fatigue, to sleep under the cannon during an engagement. But the above is, we believe, the first instance on record of a night-cap denial at an upper window to a medical man requiring medicine for a patient in danger. Without calling in question the legal right of any man to limit his labours at discretion, we subjoin an anecdote, showing the policy of attention at all times to the pressing wants of the sick. A lady required some medicine in the night for her father, who was dangerously ill. She rang the night-bell of a shop where she was a stranger, and in a few minutes was admitted. She apologised for giving so much trouble, but said that the case was urgent, and she had been waiting half an hour at the door of her regular Chemist, ringing the bell repeatedly, but could not succeed in gaining admission. The young man said there was no occasion to apologise: it was his regular duty to attend to similar cases of emergency, and he was glad to be of service on the occasion. The lady was struck by this civility, and called in the morning to open an account, observing, that a Chemist who would not serve her in case of need in the night did not deserve her custom in the day-time. For many years she not only continued to visit the shop herself, but recommended many of her friends to do the same. Thus a valuable connexion sprung up in consequence of the polite attention of a young man to the appeal of a stranger, through the medium of the night-bell.

PHARMACEUTICAL MEETING, LIVERPOOL.

ROYAL INSTITUTION, FRIDAY EVENING, AUGUST 31, 1849.

THE SECRETARY IN THE CHAIR.

Dr. Brett gave his first Lecture on Toxicology, of which the following is a short abstract:—

The term *poison* requires some definition, and the popular acceptation of it is hardly a proper one; it is not correct, for example, to suppose that those substances only are poisons, that are capable of destroying life when taken in minute quantity, for oxalic acid is a poison, and yet the smallest quantity ever known to produce death is half an ounce! Others, on the contrary, only act fatally in small quantity, as sulphate of zinc, which is thrown entirely off the stomach, if taken in large doses, while a small quantity would be absorbed, and produce death. Arsenic is poisonous in minute doses; one grain of it has been known to produce death; and even, when larger quantities are taken, it is that small portion only which becomes absorbed by the system that acts fatally. Neither is it necessary for a poison to be taken internally; arsenic has frequently destroyed life by being applied as a plaster, and many instances of external poisoning might be named. The definition of the term *poison* must therefore be a very general one, viz., a substance capable of destroying life, in either small or large doses, independent of any idiosyncratic pre-abnormal or morbid condition of the system, and independent of mechanical irritation or abrasion. Iron nails or needles, for instance, could hardly be classed as poisons, though fatal if swallowed.

The classification of poisons is very important, and often leads at once to a judgment on the character of the poison, and indicates its antidote.

They are divided into four classes:—the Irritant; Corrosive; Narcotic; Acrid Narcotic.

The first produce *irritation*, then *inflammation*, a determination of blood to the part poisoned, a quickened circulation, and absorption of the poison.

The second act locally, *destroying*, perforating, softening, and dissolving *the organic tissues* with which they come in contact, and irrespective of the vital functions, actually destroy the organs of life.

The third class neither corrode, inflame, nor irritate, but *act on the nervous system* alone, depressing the nerves, and through them paralysing the *spinal marrow and brain.*

The last resemble the *narcotics* in the *modus operandi* of their action, and *produce death in the same way*, but still produce also symptoms analogous to the first class, *irritating* and *inflaming* the stomach and bowels.

The action of a poison may be either *local* or *remote.* Sir B. Brodie found that leaves of the *Aconitum napellus* when chewed, deprived the lips of sensation for some hours; and Robiquet inverted a test tube containing prussic acid upon the end of his finger, and found it devoid of sensation for a still longer period. But it is the *remote* action of poisons to which our attention is chiefly called, and this may operate in two ways:

1st. By nervous sympathy.
2nd. By absorption.

Each of these actions have been propounded as *the only way* in which poisons act; and Morgan and Addison carried out many valuable experiments in support of their adopted theories, until they at last came to the conclusion that no such rule would apply to *all* poisons, and that truth rested with each.

On one occasion they caused the jugular vein of a dog to pass into that of another dog, so that the blood from each flowed into the other, and completely connected the veinous systems. One dog was then poisoned with the *urari* poison, and died instantly; while the other dog remained alive and unaffected, proving that the poison was not absorbed by the blood, but acted upon the brain by the nerves.

On the other hand prussiate of potash has been detected in the blood in less than two minutes after administration; and Christison mentions that ℥iv. solution of oxalic acid was thrown into the peritoneal sac of a cat, which caused death in fifteen minutes; and upon opening immediately after only ℥j. of the liquid was found in the sac, proving the rapidity of its absorption.

With regard to the chemical theory suggested by Liebig, Dr. Brett considers nothing more fallacious and unsubstantiated; the supposition that every poison, whether dilute or concentrate, potent or gradual, acts by chemical combination with organic tissue, he deems absurd; and he cannot readily conceive of an experienced physiologist entertaining such views in spite of the frequent evidence of the fatal action of a poison, when, on opening after death, no indication of irritation, inflammation, or any other trace of chemical action can be found.

Antidotes are of two characters, 1st, physiological, to counteract the effect upon the system; and 2nd, chemical, combining directly with the poison to produce insoluble or inert salts, as magnesia for sulphuric acid; lime for oxalic, &c.; albumen for corrosive sublimate; sugar for copper; tannin for tartar emetic, &c. &c.

Dr. Brett then illustrated his subject with several interesting cases in which he had been engaged, and concluded a very instructive and interesting lecture by pointing out the extreme caution necessary in medico and chemico-legal questions; the check which should be put upon conjecture, and the importance of allowing the judgment to be influenced only by the actual and ample evidence obtained.

Mr. Abraham inquired if animal charcoal had not been successfully used as an antidote to arsenic and other poisons?

Dr. Brett did not think it of much value; it had been administered with the poison to some rabbits, but they died. If of any use, he thought it must be in a large quantity, and act mechanically by protecting the coats of the stomach from absorbing the poison. Arsenic was absorbed very rapidly; he had known death ensue very shortly from the application of an arsenical plaster on the arm, and the stomach and intestines were much inflamed.

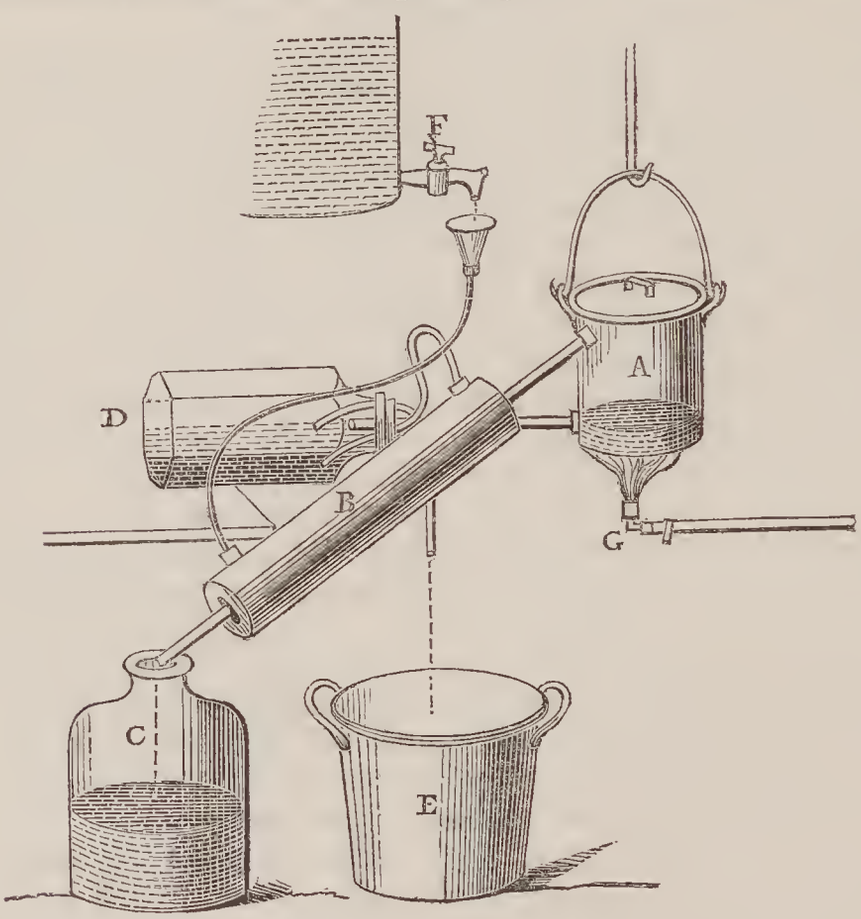
Mr. Waldie remarked that charcoal had great power in withdrawing substances from solution, as lead from its diacetate, also bitter matter from organic solutions. A considerable portion of morphia is found to be lost when animal charcoal is used, and charcoal he thought might, on this account, be useful in organic poisonings.

The hydrated oxide of iron he thought useless unless fresh prepared, as it became less soluble in acids by keeping, and long boiling rendered it very insoluble.

Dr. Brett said, the French had used the native oxide of iron with reputed success; but the insoluble salt of arsenic thus formed was readily decomposed by hydrochloric acid, and he doubted whether a sufficient quantity might not exist in the secretions to render it still dangerous.

Mr. Edwards said he believed bichloride of mercury was slightly soluble in a large excess of albumen, and that the value of the latter as an antidote was therefore impaired.

Mr. Abraham described an apparatus for distilling water over a gas flame, which he thought would be useful to those who had occasion to burn gas constantly. It required no attention except that of emptying a bucket of water occasionally where a sink was not at hand. It produced from an ordinary fish-tail burner from eight to ten ounces per hour of pure distilled water. Its construction will be understood from the annexed engraving.



A The boiler (capable of containing about a quart.)
B The condenser. *C* Receiver for the distilled water.
D Bottle into which is received the hot water from the condenser. It communicates with the boiler, so as to keep the latter constantly supplied. From the bottle proceeds an overflow pipe, which carries the excess of water into
E A bucket. *F* Is a tap supplying cold water.

Since the cut was made, Mr. Abraham has simplified the apparatus by omitting the bottle *D*, and making a direct communication between the condenser and the boiler.

It will be seen that the boiler is supplied with hot water from the condenser, and the purpose is best effected when the smallest quantity of water necessary to condense the steam is allowed to flow.

He then exhibited a minim meter, to which, instead of the piston

used by Alsop, Mr. A. had attached a vulcanised India-rubber bag (quarter ounce). This he found much more accurate than the ordinary minim measure, and much more convenien tthan Alsop's. Mr. A. mentioned that he had met with a severe accident from the explosion of a bottle sent to him as containing chloride of sulphur; he believed it to have arisen from some water having been put into the bottle. Mr. Abraham also stated that he had lately observed a very large amount of impurity in sulphate of soda, frequently lead, and generally a good deal of sulphate of iron; the latter became very obvious and troublesome when dissolved in astringent infusions. The salt was readily purified by boiling with neutral carbonate of soda (which precipitates the oxides) and recrystallisation.

Other subjects were provided for the meeting, which was adjourned on account of the lateness of the hour.

The Secretary acknowledged the receipt of *Plattner on the Blow-pipe*, presented to the Society by Dr. Muspratt; and announced for the next meeting, on Friday, the 28th instant, Dr. Nevin's lecture on Specific Gravities.

Dr. Dickenson has delivered two morning lectures on Botany; the first on "The Linnæan System;" the second on "The Natural System." These lectures have been very well attended, and much interest has been evinced on the subject. The next lecture will embrace "The Relation between the External Form and Medicinal Properties of Plants."

ORIGINAL AND EXTRACTED ARTICLES.

ON MEDICINAL WINES.

BY BUTLER LANE, M.D.

In the June number of the *Pharmaceutical Journal*, I briefly adverted to the appliance of fermentation for the purposes of Pharmacy, and I now intend entering more fully into the consideration of the subject, with the hope of inducing some of those who make Pharmacy the special province of their study, to bestow that observation and research in the inquiry which is, I believe, deserved, at the same time that it would be amply repaid.

In this age of onward movement, Pharmaceutics, in common with the other branches of medicine, have undergone great improvement. No longer a mere mechanical occupation, the art of Pharmacy now welcomes the enlightenment of science, and promises to keep pace with the intellectual advance of the day. The important change which is now progressing cannot fail to raise the position of the Pharmaceutic Practitioner, at the same time that it is hailed with warm satisfaction by the unprejudiced Surgeon and Physician, as tending to improve the resources of Medical Science, at the same time that it affords confidence in our remedial appliances in lieu of that distrust which formally almost invariably attended the ministrations of the "*Chemist and Druggist.*" All honour to those who have been instrumental in originating and

promoting this change by the establishment of the *Pharmaceutical Society*. May they continue to succeed in their endeavours, and may each individual Pharmaceutist consider it as part of his social duty to assist in promoting the object of the present organization!

I cannot refrain from thus adverting to the Pharmaceutical Society, and I feel much pleasure in submitting the present matter of my inquiry to the tribunal of their judgment, as in a great measure it more particularly belongs to their special department of medical art.

In former times the *cerevesiæ*, or medicinal beers, were in great repute, and I now find that they were much more extensively employed than I had any idea of. These *cerevesiæ* were prepared by adding medicinal substances in powder to malt wort, and letting them ferment together. There were no less than thirty *cerevesiæ* in *Quincey's Dispensatory* of 1739, but towards the end of the 18th century they fell into total disuse. In *Lewis's Dispensatory* of 1785, however, there is a strong argument in favour of fermented preparations, and it is there asserted that the properties of drugs are extracted with much more energy by fermentation than by simple digestion. In the present day, I believe that the agency of fermentation is still tacitly adopted to a considerable extent, especially in preparations of opium and sarsaparilla. Thus, therefore, I do not claim much merit of originality in recommending fermentation as a method of medicinal preparation; but it may be said in excuse for the revival of an old process, that it certainly seems probable, in these days of chemical improvement, that the principle may now be carried out much more effectively than formerly. If, therefore, I can but show sufficient evidence in favour of the process, on the score of economy and medicinal efficacy, my views will claim scrutiny and trial; and I do not doubt that tact and experience may carry the matter to a great degree of perfection.

We are indebted to the botanical kingdom for a large proportion of medicinal remedies, and their best adaptation to practical purposes is highly important. Chemistry has done much in the recognition and isolation of peculiar active principles; but in many instances the gross extract of active medicinal matter from that which is inert is preferred for therapeutical purposes by practical men; and again, the expensive nature of the chemical processes requisite for the obtainment of the various alkaloids, &c., constitute an objection, especially if preparations more economical and equally efficient can be made available.

In the application of the process of fermentation, it is of course requisite to select those medicinal substances of which the active principles are in a great measure capable of aqueous solution, and

I shall presently advert individually to those in the preparation of which I have had experience. From some drugs the entire of the medicinal essence may be thus obtained, constituting a perfect extract; of others, only a certain portion of the active matter will be separated and made available; but that may be the leading principle and in its most efficient form, inasmuch as it will be that which will be most readily recognised and assimilated by the human economy.

The aqueous solution of the medicinal principle must be effected according to the method best adapted to each individual instance. Various degrees of temperature should be employed in infusing and digesting the medicinal material. In many instances it will be found that it is requisite to use a high degree of temperature, and that it should be applied continuously for some time. In others, tepid or cold infusion, or digestion, is preferable; and frequently one part of the aqueous menstruum may be used cold, and the other in a heated state.

The aqueous extract should be submitted to fermentation in a varied state, according to special circumstances. Thus, in reference to opium, its entire substance should undergo chemical action, separating merely the ligneous and earthy matter of the crude extract; and on the other hand, in treating hyoscyamus, digitalis, &c., though mucilaginous matter is extracted in the first instance, yet it should all be separated before fermentation is allowed to commence. Again, a considerable degree of concentration may sometimes be effected in fermented preparations; in some much more than in others.

Sugar or alcohol, singly, or both combined, in the aqueous solution of any appropriate vegetable substance, will be efficient in its preservation. Now sugar may readily be made the medium of the formation of alcohol to a considerable extent by exciting fermentative action after the sugar has been dissolved in the medicinal solution; and I believe that, in the great majority of instances, the change may be effected without prejudice to the active medicinal principle; while the alcohol which is generated assumes that state of intimate vinous combination which is very preferable to the comparatively raw state in which it exists in tinctures. The perfect conversion of three pounds of sugar would afford about a pound-and-a-half of rectified spirit; but in the ordinary course of vinous fermentation, that perfect conversion does not take place, but it is usually effected to a sufficient extent for the preservation of seven wine pints of medicinal solution when combined therewith. The proportion of sugar must, however, be varied in different cases, and if a sweet preparation be desirable, or its preservation for a lengthened period be required, then a larger quantity of sugar must often be used. Thus the minimum proportion of

sugar in one gallon of medicated wine must be three pounds avoirdupois—not three pounds of sugar added to a gallon of the liquor, but the sugar must form an integral part of the gallon, and will occupy about one-half part in eight. It is of consequence that the due proportion of sugar should be used to avoid the liability to acetous action; and good loaf-sugar ought always to be employed, as the fermentation then goes on more thoroughly, and the wine is more readily obtained fine and clear.

I may here remark, that a small proportion of free acid is always present in the medicinal wines; but, far from being really an objection, I believe it helps to keep the active principle in a natural state of solution, and when administered presents it to the stomach in the state most grateful and readily assimilated. All who have tried the wines, whether tonic, sedative, or aperient, have noticed how remarkably well they have agreed with the stomach when given simply by themselves without any adjuvant or corrigent additions.

The saccharine solution being duly prepared, yeast must then be added, and the wash be placed to ferment in jars or casks, at first open, and subsequently lightly closed. To effect the fermenting process quickly an equable temperature between 70° and 80° should be maintained; but I believe the process will take place more perfectly, though more slowly, at a temperature between 55° and 65°. If the higher temperature be employed, it should at any rate be reduced after a fortnight, and, as soon as the violence of the fermentation subsides, the atmospheric air should be more perfectly excluded. After a further variable period the sweetness will be found to have gone off considerably, the liquor to have become fine, and the fermentative action to have ceased in a great measure; it should then be carefully decanted from the lees by syphon or otherwise into fresh vessels, which are to be carefully closed. If from undue exposure to air or any other cause the fermentative action does not subside when judged to have proceeded sufficiently, it must be arrested by the addition of a little oxide of manganese, sulphuret of potash, or even a small proportion of spirits of wine, and while yet fermenting it must be kept in bulk, and on no account bottled.

It is a great object to know when the fermenting process, having gone on to a sufficient extent, it becomes desirable to check its further progress, and prevent its beginning afresh. To seize the proper moment of time requires care and judgment; and the state of the wine as to taste and appearance, I believe, will alone afford the criterion. Acting on the suggestion of Dr. Golding Bird, I endeavoured, with the aid of the hydrometer, to ascertain the progressive formation of alcohol; but I found the variations of specific gravity so irregular, according to the peculiarity of the

substance in solution, from the fermentative disturbance, that I could obtain no satisfactory results. Generally, an increase of specific gravity would be apparent at first, and finally a decrease of from 5 to 50 per mil. would occur. If, however, the wines be well and thoroughly fermented in the manner which I have pointed out, I believe there will generally be but little difficulty in obtaining them fine and in good condition. Before bottling, they require some exposure to the air, and occasionally fining with isinglass will be found necessary. In my experience, I have found that the different medicinal wines may be got ready for use within a period of three months; and, when bottled, they will keep any length of time.

Ewell, Surrey. (*To be continued*).

PORTABLE MEDICINES FOR DIARRHŒA.

Confection of Opium having been extensively used during the late epidemic, we have found the following a convenient method of preparing it in a portable form:—The ingredients are reduced to powder, sugar being substituted for the syrup ordered in the Pharmacopœa, so that 20 grains of this powder are medicinally equal to 20 grains of the confection. The powder is then mixed into a thick paste with water (a drachm to the ounce), and divided into boluses or pipes, each containing 20 grains of confection of opium. The excess of sugar gives it the character of a lozenge, and it may be either taken in that form, or dissolved (or rather suspended) in water.

Aromatic Confection is prepared in a similar way, in doses of a scruple or half a drachm, and the same with other medicines, calomel, ammonio-tartrate of iron, &c.

The several medicines in this form are carried in the pocket by the medical inspectors, who, when calling on the patients in the parishes or unions, find it convenient to have the remedy at hand, ready for administration.

PROPOSED RESTRICTIONS ON THE SALE OF ARSENIC.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Having had the honour to be appointed by the Provincial Medical Association to conduct an inquiry into the means to be adopted for the prevention of secret poisoning, I cannot be too thankful to you for permitting me to submit the following Questions to the Members of the Pharmaceutical Society. I have affixed a *number* to each, so that the Answers, with the number to indicate the question replied to, will be all that I require; and most sincerely do I hope that every Member will communicate his own ideas and wishes upon

the subject, so that a mass of facts may be gathered upon which to found a practical remedy for a great and crying evil.

I remain, Sir, your obedient servant,

Bath, Sept. 19, 1849. JAMES TUNSTALL, M.D.

QUESTIONS.

1. Do you keep arsenious acid for the purpose of sale?
2. If so, is it kept in the open shop with your other drugs?
3. If not, where? and who has access to it?

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4. Do you sell it by wholesale?
5. What is your average annual consumption?

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6. Do you sell it by retail in small quantities?
7. Do you require a witness?
8. For what purposes is it usually purchased?
9. Would your business be injured if its sale, in small quantities to the public, were prohibited?

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10. Should its retail sale be prohibited, are you aware of any other poisons which ought to be placed under the same restrictions? If so, name them.
11. Without mentioning parties' names, are you aware of any shopkeepers, not Chemists, who sell poisonous drugs by retail?
12. Would it be injurious to your business, as a retail and Pharmaceutical Chemist, if a licence to sell arsenic and the poisons mentioned by you in your reply to No. 10 was compulsory, always excepting that ordered by a Medical Practitioner in a prescription, or for his own dispensary, or for the purpose of preparing the preparations ordered by the Pharmacopœia?

P.S. To save trouble, I have divided the questions into four heads, and have only to add, that speedy replies will be esteemed as favours.

J. T.

THE SUBSTITUTION OF ONE MEDICINE FOR ANOTHER.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

GRIFFITH *v.* WALFORD.

SIR,—In the last number of your Journal an article is devoted to this case, under the head of "THE SUBSTITUTION OF ONE MEDICINE FOR ANOTHER;" and you allude particularly to the report of the trial, which has been industriously circulated by the plaintiff in the public journals, and also in the form of a pamphlet. This report is designated by you as an *admirable* report. It certainly contains a full statement of certain portions of the case, and gives the various addresses of the plaintiff at considerable length, but there are two points entirely omitted which, in justice to the defendant, should have been inserted. I allude *first*, to the particulars of the plaintiff's demand; and, *secondly*, the amount of the verdict which he obtained. These two points are essential to a correct knowledge of the case. The lengthy report from which you drew your information not only omits them entirely, but is so framed as to make it appear that the plaintiff obtained all that he demanded. Such is the impression which would naturally occur to the mind of every reader on perusing the circumstances as they are detailed in the report, and thus, as in your own case, an erroneous impression would be formed. The plaintiff's demand was as follows :—

		£	s.	d
1849.	To expenses incurred by the plaintiff being detained in London for two days, namely, on the 2d and 3d days of April, 1849, in consequence of defendant having administered to him a solution of sulphate of magnesia, instead of Sir James Murray's fluid magnesia .	2	0	0
	To loss sustained thereby in consequence of having to pay the wages of twenty men and servants who were unemployed for two days waiting for plaintiff to give them orders	6	0	0
	To loss sustained in consequence of three horses standing idle from the same cause.....	1	16	0
	To rent and common charges of concerns for two days...	2	0	0
	To loss of profit of trade for two days in consequence of the above	6	0	0
	To injury and inconvenience to plaintiff's health in consequence of the above			
		£17	16	0

The plaintiff thus endeavoured to obtain £17 16*s. from the pocket of the defendant. The jury gave him a verdict of* 5*s., which entitled him to* 3*s.* 4*d. costs.*

In your brief statement of the facts of the case, you have also been unintentionally led into error by relying explicitly upon the faith of this *exparte* report, you have therefore inaccurately represented the circumstances as they occurred. The most important evidence in the case, that of the witness Alexander Jackson, is not reported so fully, or so clearly, as the other and more unimportant portions of the evidence. The witness Jackson, who is Messrs. Lunn and Walford's apprentice, stated most distinctly, that when the plaintiff first came into the defendant's shop, he said, *that he wanted some advice, and did not ask for fluid magnesia, or any other particular medicine—if he had, witness could have readily supplied him;* but as the plaintiff said he wanted advice, which the witness did not feel himself qualified to give, and the defendant was then absent, plaintiff was about to leave unsupplied with any medicine—he was in reality in the act of quitting the shop, when Mr. Walford (the defendant) came in. The witness informed Mr. Walford that the plaintiff wanted some advice. Plaintiff complained to the defendant that he was suffering from headache, flatulency, and heartburn; and the defendant, having asked him a question or two as to what he had been taking, and looked at his tongue, administered to him a mixture of bi-carbonate of magnesia, which had been prepared by Mr. Lunn. Whilst he was pouring out the medicine the plaintiff said he should like Murray's fluid magnesia; to which defendant replied he would give him something quite as good. The plaintiff made no further objection or observation, but swallowed the dose, and then complained that the defendant had given him Epsom salts. These are the real facts as actually proved in evidence; and it was clearly shown by the testimony of Mr. Thomas Lloyd, of Basinghall Street, whose evidence it was admitted on both sides was given in the most able manner, that the dose administered was mild and innocuous, and totally incapable of producing the violent results complained of by the plaintiff, and was, in fact, very proper medicine to be given to the plaintiff under the circumstances.

Every one will be disposed to concur in your observations as to the substitution of one medicine for another; but in the application of those remarks to the present case, you have, as before stated, been inadvertently led into error.

No *new point* was started in this case, nor did any thing arise in the course of the hearing to render it of the slightest importance, either to the

medical profession or public in a legal point of view. It established no precedent—settled no disputed point.

If the defendant had been asked for some particular medicine, and had wilfully substituted a dose of some other description contrary to the express direction of the plaintiff, and thereby the plaintiff had sustained injury, no doubt the defendant would have been liable for all the damages which could have been established against him; but in the present instance, where advice had been asked, and the defendant, who is a duly qualified surgeon, acting according to the best of his judgment and discretion, administered a dose of medicine proved to be proper in its application and harmless in effect, and where neither malice, ignorance, or negligence is shown to exist on one side, nor damage proved on the other, the defendant was most unquestionably entitled to a verdict, and so thought the judge, and, I may add, the majority of the jury (for the jury consisted of five), and of these *four* were desirous of returning a verdict for the defendant, but *one* persisted in a verdict for the plaintiff—and after retiring, and *a considerable time had elapsed*, the matter was eventually arranged by their returning a verdict of five shillings, as before stated. This information I subsequently obtained from two of the jurymen. The defendant, under the advice of his counsel, would have immediately applied for a new trial, but the very trifling damages awarded, after the strenuous efforts which had been made to inflate the case into undue importance, threw an air of ridicule over the whole proceedings, and did not justify such an application on the part of the defendant.

How far the plaintiff was satisfied, or had reason to be satisfied with the result, may be judged from the circumstance of his applying for a new trial, and also making application for the expenses of himself and witness from Wolverhampton—expenses which, it is obvious, were very inadequately covered by the 3*s.* 4*d.* awarded.

Very strenuous attempts have been subsequently made, evidently dictated by no disinterested motive, to attach a degree of importance to this case totally unwarranted by the circumstances; and by the suppression of some parts of the case and the undue extension of others, the matter is made to assume an appearance which it did not actually present. Of this your observations afford abundant proof; and as your remarks, unaccompanied by the present explanation, are calculated to convey an erroneous impression of the defendant's conduct, and inflict upon him serious injury in his profession, I trust that in justice to the defendant (who is a most respectable practitioner) you will insert this communication in your next number.

I have the honour to remain, Sir, yours most obediently,

THOS. PRYER, *Defendant's Attorney.*

11, *Artillery Place, Finsbury Square*, 13*th Sept.*, 1849.

[It was not our intention to convey such an impression. In the case of Mr. Walford, the evidence led us to believe that the order was misunderstood. The allegation of a *fraudulent* substitution in the sale of a dose of medicine (price 3*d.* !) gave us an opportunity of alluding to frauds in general, otherwise we should not have noticed the case.—ED.]

ON CARBONATE OF LIME AS AN INGREDIENT OF SEA-WATER.

BY JOHN DAVY, M.D., F.R.S.

London and Edinburgh, Inspector-General of Army Hospitals, &c.

THE manner in which limestone cliffs rising above deep water are worn by the action of the sea, as it were by a weak acid, such as we know it contains, *viz.*, the carbonic—the manner, further, in which the sand on low

shores where the waves break becomes consolidated, converted into sandstone, by the deposition of carbonate of lime from sea-water owing to the escape of carbonic acid gas,—are facts clearly proving that carbonate of lime is, as a constituent of sea-water, neither rare of occurrence, nor unimportant in the economy of nature, inasmuch as the phenomena alluded to,—the one destructive, the other restorative,—have been observed in most parts of our globe where geological inquiry has been instituted.

Reflecting on the subject, it seemed to me desirable to ascertain whether carbonate of lime as an ingredient of sea-water is chiefly confined to the proximity of coasts, or, not so limited, enters into the composition of the ocean in its widest expanse.

On a voyage from Barbados in the West Indies to England, in November last (1848), I availed myself of the opportunity to make some trials to endeavour to determine this, the results of which I shall now briefly relate.

First, I may mention that water from Carlisle Bay, in Barbados, tested for carbonate of lime, gave strong indications of its presence; thus a well-marked precipitate was produced by ammonia, after the addition of muriate of ammonia in excess, that is, more than was sufficient to prevent the separation of the magnesia which enters so largely into the composition of sea-water; and a like effect was produced either by boiling the water so as to expel the carbonic acid, or by evaporation to dryness and resolution of the soluble salts.

On the voyage across the Atlantic, the test by means of ammonia and muriate of ammonia was employed, acting on about a pint of water taken from the surface. The first trial was made on the 15th of November, when in latitude 20° 30′ N., and longitude 63° 20′ W., more than 100 miles from any land; the result was negative. Further trials were made on the 22nd of the same month in lat. 32° 53′, long. 45° 10′; on the 24th, in lat. 36° 23′, long. 37° 21′; on the 25th, in lat. 37° 21′, long. 33° 34′; on the 26th, in lat. 38° 28′, long. 30° 2′; on the 27th, when off Funchal of the Western Islands, in lat. 38° 32′, long. 28° 40′, about a mile and a half from the shore, the water deep blue, as it always is out of soundings: in all these instances likewise the results were negative; the transparency of the water was nowise impaired by the test applied. The last trial was made on the 3rd of December, when in the Channel off Portland Head, about fifteen miles; now slight traces of carbonate of lime were obtained, a just perceptible turbidness being produced.

The sea-water from Carlisle Bay, the shore of which and the adjoining coast are calcareous, yielded about 1 per 10,000 of carbonate of lime, after evaporation of the water to dryness, and the resolution of the saline matter. A specimen of water taken up on the voyage off the volcanic island of Fayal, about a mile from land, yielded a residue which consisted chiefly of sulphate of lime, with a very little carbonate of lime,—a mere trace; acted on by an acid it gave off only a very few minute air-bubbles. A specimen taken up off Portland Head, about fifteen miles, yielded on evaporation and resolution of the saline matter only a very minute residue, about .4 only per 10,000; it consisted in part of carbonate and in part of sulphate of lime.

What may be inferred from these results? Do they not tend to prove that carbonate of lime, except in very minute proportion, does not belong to water of the ocean at any great distance from land? And, further, do they not favour the inference, that, when in notable proportion, it is in consequence of proximity to land, and of land the shores of which are formed chiefly of calcareous rock? In using the word *proximity*, I would not limit the distance implied to a few miles, but rather to fifty or 100, as I am acquainted with shores consisting of volcanic islands in the Caribbean Sea destitute of calcareous rock, on which, in certain situations,

sandstone is now forming by the deposition from sea-water of carbonate of lime.

Should these inferences be confirmed by more extensive inquiry, they will harmonise well with the facts first referred to, the solvent power, on one hand, of sea-water, impregnated with carbonic acid on cliffs of calcareous rock in situations not favourable to the disengagement of carbonic acid gas; and the deposition, on the other hand, of carbonate of lime to perform the part of a cement on sand, converting it into sandstone, in warm shallows, where the waves break under circumstances, such as these are, favourable to the disengagement of this gas; and, I hardly need add, that the same inferences will accord well with what may be supposed to be the requirements of organisation, in the instances of all those living things inhabiting the sea, into the hard parts of which carbonate of lime enters as an element.

Apart from the economy of nature, the subject under consideration is not without interest in another relation,—I allude to steam navigation. The boilers of sea-going steam-vessels are liable to suffer from an incrustation of solid matter firmly adhering and with difficulty detached, liable to be formed on their inside, owing to a deposition which takes place from the salt water used for the production of steam. On one occasion that I examined a portion of such an incrustation taken from the boiler of the *Conway*, a vessel belonging to the West Indian Steam Packet Company, I found it to consist principally of sulphate of lime, and to contain a small proportion only of carbonate of lime. This vessel had been employed previously in transatlantic voyages, and also in intercolonial ones, plying between Bermudas and the Island of St. Thomas, and in the Caribbean Sea and the Gulf of Mexico.

The composition of this incrustation, like the preceding results, would seem to denote, if any satisfactory inference may be drawn from it, that carbonate of lime is in small proportion in deep water distant from land, and that sulphate of lime is commonly more abundant. The results of a few trials I have made, whilst rather confirmatory of this conclusion, showed marked differences as to the proportion of sulphate of lime in sea-water in different situations. That from Carlisle Bay was found to contain 11·3 per 10,000. A specimen taken up in lat. 29° 19′ and long. 50° 45′ yielded about 2 per 10,000, with a trace of carbonate of lime. A specimen taken up off Fayal yielded about 9 per 10,000, also with a trace of carbonate of lime. One taken up off Portland Head, about fifteen miles distant, yielded, as already remarked, only .4 per 10,000, part of which was sulphate, part carbonate of lime.

By certain management, I am informed, as by not allowing the sea-water in the boilers to be concentrated beyond a certain degree, the incrustation, in the instances of the transatlantic steamers, is in a great measure prevented. Perhaps it might be prevented altogether, were sea-water never used but with this precaution, and taken up at a good distance from land, and in situations where it is known that the proportion of sulphate of lime is small. If this suggestion be of any worth, further, more extensive and exact inquiry will be requisite to determine the proportion of sulphate of lime in different parts of the ocean, and more especially towards land. By the aid of the transatlantic steam navigation companies means for such an inquiry may easily be obtained; and it can hardly be doubted that the results will amply repay any cost or trouble incurred.—*Philosophical Magazine, Sept.* 1849.

Lesketh How, Ambleside, March 29, 1849.

ON THE RELATIVE EXPANSIONS OF MIXTURES OF ALCOHOL AND WATER

Under the influence of a certain rise of Temperature; and on a New Instrument for taking the Specific Gravities of the same.

BY G. H. MAKINS, ESQ.

About two years since, I made some experiments upon an instrument described by the Abbé Vidal of Toulon, and called by him the "Ebullioscope Alcòométrique."

The instrument was designed for estimating the proportion of alcohol in mixtures containing it, and especially in those wherein specific gravity gave false results, in consequence of saccharine or saline bodies being held in solution, which so increased the specific gravity as often to disguise even large proportions of alcohol.

Before going to the immediate subject of this paper, I may just mention the conclusions to which I came with regard to the instrument in question. Having been put before Mr. Bate (the maker of Sikes's hydrometer to the Excise and Customs) as an instrument likely to supersede the hydrometer, from the fact of its embracing indications which the hydrometer itself could not show, while at the same time the ordinary indications of the latter were readily obtained by it, it became an object to test carefully its effectiveness.

I found, as most persons will anticipate, that the first and greatest objection to the instrument was dependent on the fact of the boiling point of a liquid being so considerably influenced by the state of the barometer at the time of its examination. For, as the latter is high, so will the point of ebullition be high in proportion, and consequently the specific gravity of the alcohol under examination appear lower than it should do.

We examined, at the time, the difference in the boiling points, between the barometer points 29.1 and 30.1, in several specimens of alcohol of different degrees of dilution; as examples from these I may mention Excise proof, in which, for the one-inch pressure, there was a difference of 1.4° temperature; and in the case of 70 under-proof (specific gravity 977.2), we found as much as 1.8° for the inch of difference.

A second, and great difficulty, especially to persons not much accustomed to chemical manipulation, as, for instance, those using excise instruments, consists in the extreme care required to read off the degree indicated by the ebullioscope, *just at the moment* of the boiling of the liquid; for, if this be not done precisely at the proper time, evaporation of the spirit speedily takes place, rendering the specific gravity of the mixture very much higher than it was at the commencement of the examination.

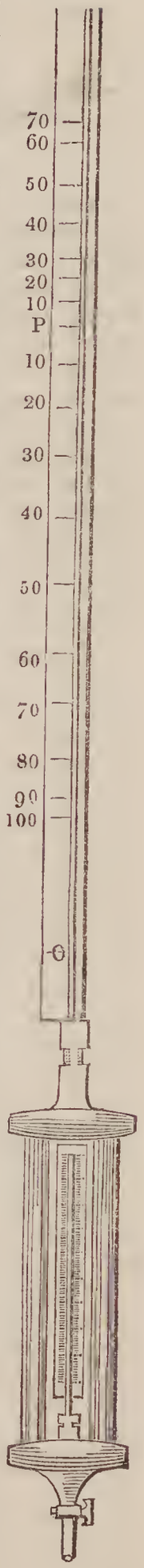
The instrument being now constructed under a patent in London, has induced the makers to bestow much care upon its construction, and consequently to obviate the former evil by an adjustment upon the scale to be regulated by the height of the barometer.

During the time I was engaged on this subject, Mr. Negretti, who had bestowed much care and thought upon the thermometers for the instrument, suggested that another iustrument might be made in which the sources of error would be less, and wherein the simple expansion of the spirit by a certain number of degrees of heat would effect the end of ebullition. From some experiments he showed me, I was induced at once to undertake the examination of the subject with him. I had some hesitation as to whether the incomplete results we have already obtained were worth the attention of the Society, for I am not yet able, from various causes, to communicate the whole of our experiments, but am induced to bring forward that part of them relating to the expansion of spirits, not

containing saccharine matter, from the fact of an article having appeared describing an apparatus for the same purpose, and detailing some results obtained with it, which I do not consider altogether correct; at least, my own conclusions, based on most careful experiments, seem to contradict them. The article I allude to is by Silbermann, and appeared in the *Comptes' Rendus* for October 23, 1848; which, by the way, was transcribed into the January number of the *Chemical Gazette.*

I will now describe the instrument we employed, as, upon inspection, it may seem a somewhat complicated one to effect an object which might be brought about in a tube similar to the common thermometer tube; indeed, a thermometer bulb and tube on a large scale, furnished with a stopper below for the admission and adjustment of the sample of spirit, would very well answer the purpose. Our instrument consists of a couple of chambers connected by a set of tubes (see fig. 1); from the upper chamber rises a tube and scale, the former of as uniform bore as could be procured, and to the lower is attached a small stop-cock. The form given to the instrument was adopted in order to afford as large a metallic surface as possible, so as to heat a badly-conducting fluid quickly and uniformly, and its parts were so shaped and put together, that the free exit of any portions of air which might enter with the spirit by the stop-cock was ensured. A thermometer was placed in the interior for showing the temperature more correctly of the enclosed spirit.

Fig. 1.



This last is a point of some importance to the results afforded, and I may instance what I have frequently observed in taking the specific gravity of alcoholic liquids and similar badly conducting fluids, viz., that a thermometer will often indicate a difference of a degree *or more* in different parts of a thousand-grain bottle, according to the manner in which the bottle has been filled. In using the instrument, our plan was to fill it slowly by gradual depression in a tall vessel containing the specimen for examination. A slight shaking then sufficed to dislodge any air which might have been adherent to the sides of the tubes, &c., after which the zero point was carefully adjusted by means of the stop-cock. This having been effected, the temperature of the whole was brought to 60° Fahr. by means of immersion in a large vessel of water at that temperature. It was then quickly plunged into a second vessel containing water at 90° Fahr., and agitated until the thermometer in the instrument indicated this rise of 30° Fahr., when the expansion was carefully noted.

The actual expansions are here, of course, not observed, no allowance being made for that of the instrument itself, which is considerable, and diminishes, by just its amount, that of its contents; all that is here ascertained being the relative dilatation of the several specimens of different specific gravity.

Attention may here be drawn to the difference in the amount of expansion for the same number of degrees increase of temperature when this increase is in different parts of the thermometric scale. And again, that this difference increases as the proportion of alcohol in a mixture is diminished. In the case of proof spirit for example, I found that between 60° and 90° Fahr., an expansion indicated by a rise of 6.48 inches on

the scale was obtained, while between 90° and 120° Fahr. it increased to 6.84 inches.

The most convenient temperature for operating was between 62° and 92° Fahr., and a number of specimens were first very carefully prepared, to agree with the indications of Sikes' hydrometer, or as nearly as possible to these. The spirits were allowed to stand 48 hours after mixing before being subjected to expansion, and the laboratory was kept as nearly as possible at 62° Fahr.

We commenced with the examination of distilled water (the 100 point of Sikes), the water having been previously boiled, so as to expel any air contained in it. The stem and body of the instrument happened to be so proportioned as to give a rise of 1.47 inches for the 30° of difference of temperature; and the time occupied in thoroughly heating the water amounted (generally) to about one minute. As distilled water formed our starting point of comparison, we repeated the experiment with it several times with every possible care, but uniformly with the same results.

The measurements of the expansions of the samples we examined, each ascending by 10° of Sikes' hydrometer, are given in the table below:

		Inches.
90	under-proof gave an increase of	1.72
80	.....	2.10
69.9	.....	2.69
60	.....	3.30
50.1	.....	3.96
39.7	.....	4.69
30.1	.....	5.32
20	.....	5.78
10.7	.....	6.18
Proof	.....	6.48

The experiments upon this last and upon water, as also upon the specimen 70° over-proof, which I shall have to mention, were several times repeated, but the same amount of expansion was uniformly obtained.

Then to pass to over-proof specimens.

		Inches.
10	over-proof rose to.....	6.72
20.2	.....	6.94
30.2	.....	7.15
40.2	.....	7.43
49.5	.....	7.72
60.4	.....	8.03
70	.....	8.13

We stopped our examination at 70° over-proof. I have here constructed a scale, which, for distinctness, is divided into two parts. In the first (Fig. 2), the assumed expansion of anhydrous alcohol for the 30° of increase of temperature between 62° and 92° is shewn. The space is divided into 100 equal parts, each part representing 1 per cent. of alcohol; at the side are placed the expansions of specimens (each descending by 10° of Sikes') from anhydrous alcohol to water. The zero point (Fig. 1) has been omitted in the scales, to diminish their length; it should be placed 1.47 inch below the first division, and represents the height to which the stem of the instrument was filled in each case, previous to expansion. Alcohol, of 70° over-proof, consists of about 6 parts water to 94 of alcohol, so that in the construction of the table this expansion of alcohol of 70° over-proof has been divided into 94 equal parts, each division representing 1 volume of alcohol; to these 94, 6 divisions have been

FIG. 2.

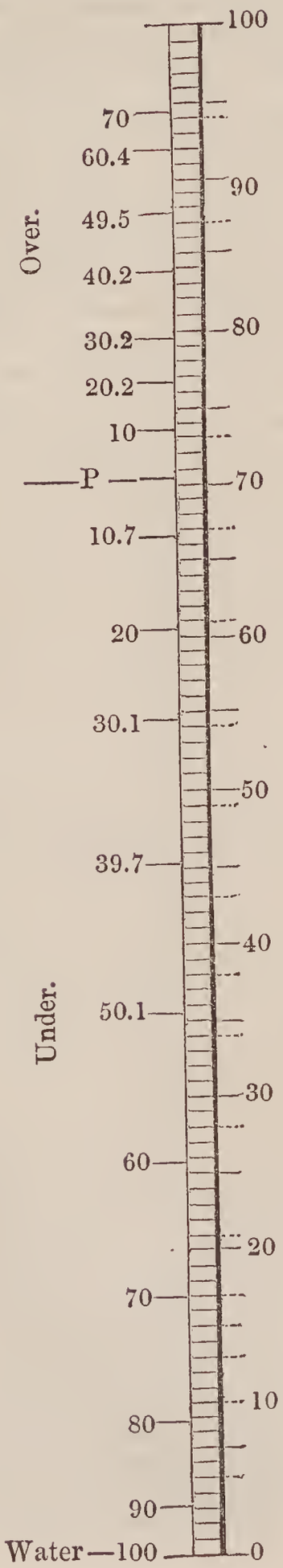
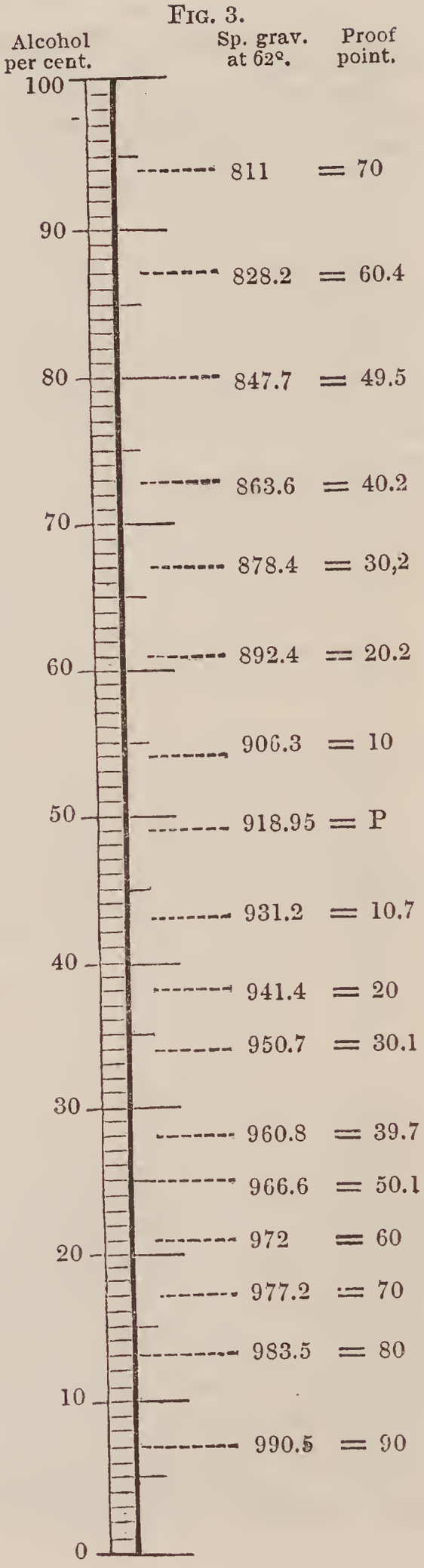

Over.
Under.
Water
100
70
60.4
49.5
40.2
30.2
20.2
10
P
10.7
20
30.1
39.7
50.1
60
70
80
90
100
90
80
70
60
50
40
30
20
10
0

FIG. 3.


Alcohol per cent.
Sp. grav. at 62°.
Proof point.
100
90
80
70
60
50
40
30
20
10
0
811 = 70
828.2 = 60.4
847.7 = 49.5
863.6 = 40.2
878.4 = 30,2
892.4 = 20.2
906.3 = 10
918.95 = P
931.2 = 10.7
941.4 = 20
950.7 = 30.1
960.8 = 39.7
966.6 = 50.1
972 = 60
977.2 = 70
983.5 = 80
990.5 = 90

added to make up 100, thus completing the range between water and anhydrous alcohol.

The second scale (Fig. 3) is similarly divided into 100 parts, and opposite these divisions, at their proper points as to proportions of alcohol and water, are ranged the several proof points examined, with their specific gravity at 62° Fahr.

On comparing the two tables, a gradual increase will be observed in the rate of expansion from some points, and a decrease from others; and these amounts of increase and decrease do not in any way correspond to the relative quantities of alcohol and of water in the mixtures, but are totally independent of them.

Now from Silbermann's paper you might be led to a very different conclusion, viz., to this—that the expansion takes place at a uniform rate of increase, corresponding to the increasing proportions of alcohol, for he says, "If a series of mixtures of alcohol and water be made, beginning with water 100 parts, alcohol 0; water 99, alcohol 1; water 98, alcohol 2; water 97, alcohol 3, &c.; up to water 0, alcohol 100; and their several points of elevation at the respective temperatures of 25° and 50° (cent) be carefully marked on the tube, a complete centesimal alcoholometric scale will be produced, which will indicate the quantity of alcohol contained in any mixture of alcohol and water by introducing it at 25°, and afterwards heating it up to 50°."

If the measurements I have given are compared, it will be found that they are in an increasing ratio up to 40 under-proof (which contains about 28 alcohol + 72 water); they then decrease somewhat rapidly to 30 over-proof. A third change then takes place, and they again increase to 60 over-proof. And lastly, they again decrease very rapidly to 70 over-proof; and possibly to anhydrous alcohol, though, from the various sources of error in observations on very strong alcohol, we did not use it above 70 over-proof; that is to say, of a specific gravity of 0.811 at 62°.

Now, if all this be true, and I may state that every possible precaution was observed to ensure the accuracy of the experiments, it becomes a question to determine why these expansions do not take place just in the proportion of the alcohol contained in the respective mixtures, or, in other words, why certain regular variations in the rate of expansion take place about certain points in the scale. I believe the answer may be satisfactorily given in a few words; namely, that the expansions depend on the existence of certain definite hydrates of alcohol, which hydrates are formed somewhere near the proportions at which these changes occur.

In conclusion I must repeat, that the experiments I have described were undertaken some two years since, and, having been prevented carrying them fully out at the time, I did not intend to bring them before the Society until they had been brought into a much more definite form, by repeating them on mixtures containing alcohol in regularly increasing proportions; but the appearance of the paper I have mentioned compels me to put them, incomplete as they are, into the form of a notice, hoping, as I do, to work the subject fully out, and, having done so, to bring it again before the Members.

I may mention that the instrument we have used (or a more simple modification of it) affords a very ready and accurate means for the determination of the specific gravity of such mixtures, and is, I believe, much more likely to be useful than the common glass hydrometer now so much employed for the purpose.

The sensibility may, of course, be augmented by increasing the proportion of the chamber as compared with the tube, always taking care not to have the latter so small as to be influenced to any great extent by capillary action; again, by using a greater range or higher temperature; and,

lastly, by making the chamber of such form and material as shall yield but little to expansion, and consequently exert a lesser influence upon the expansion of the liquid contained in it.

Mr. Negretti is now making the instrument in a simple and inexpensive shape for such purposes.—*Journal of the Chemical Society.*

TO PRESERVE MILK OR CREAM.

To preserve milk or cream, according to Mr. Bethel, who has taken out a patent for this invention, it is first scalded, and then impregnated with carbonic acid gas in a soda-water machine. When the milk is charged with the gas, it is drawn off into bottles, and corked in the usual way, or, instead of being put into ordinary bottles (from which, as soon as opened, the whole of the milk must be poured out), it may be put into strong metal barrels, or cases, or jars, or bottles supplied with a cock or valve attached to a pipe leading to the bottom of the barrel, case, jar, or bottle; so that, on opening the cock, a portion only of the milk may be drawn off at a time, the pressure of the gas within the barrel, case, jar, or bottle, being sufficient to force the milk out; and for keeping milk or cream a moderate time, it is sufficient to put the milk, after it has been scalded, into the metal barrels or vessels, and then force in the carbonic acid gas by an air-pump through the cock; or the milk or cream may be charged with carbonic acid gas by any other of the various means now well known for supplying carbonic acid gas to liquids. For milk or cream, the patentee prefers using carbonic acid gas made by the mixture of carbonate of soda and acid. The gas he washes in water before it is used, and he scalds or boils the milk before it is prepared.—Newton's *Journal*, August, 1849.

THE MODE OF VALUING A CHEMIST'S BUSINESS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In this month's Journal you have stated the usual mode by which the value of a Chemist's business is estimated. You have, however, made a remark in reference to the manner of valuing the stock and fixtures, which I cannot allow to pass unnoticed. It runs thus:—"The stock is usually valued at about twenty or thirty per cent. under prime cost, and the fixtures at a considerably larger reduction, according to their condition." As it regards the fixtures your remark is perfectly correct, as they must necessarily diminish in value every year. It is, however, far otherwise with the stock, which is of recent purchase, and which I beg to say *is usually valued at the market price, presuming the quality to be unexceptionable* and the quantity in proportion to the returns of the business.* It is true well nigh obsolete drugs or articles of questionable character are fairly subject to a large discount; but these form only a small amount in stocks generally.

By inserting this note in your widely-circulated Journal, you will greatly oblige me, and enable me to face again with pleasure those gentlemen who have kindly entrusted the valuation of their stock and fixtures to me, which I certainly could not do had I allowed their property to change hands upon the terms you lay down, which I believe to be "devoid of equity and contrary to usage."

I remain your obedient servant,

51, *Judd Street*, 14*th Sept.*, 1849. B. Humpage.

* "Presuming the quality to be unexceptionable," we quite agree with Mr. Humpage.—Ed.

THE LABORATORY OF BERZELIUS.

In a very interesting notice which M. Louget has just published on this illustrious Swedish chemist, there is a description of his laboratory by M. Johnston, which will be read with interest:—

"The Academy of Sciences, of which Berzelius is the perpetual secretary, and in the buildings of which he has his own laboratory, have lately bought for him a larger and more commodious house, and I arrived precisely at the time when he was occupied in removing to it—a period by no means favourable for my object, as his first laboratory was almost empty, and his new one not yet completely organised. Nevertheless, he offered with much kindness to make a series of experiments with me; a proposition which pleased me greatly, as it gave me an opportunity of observing his manner of operating, and of acquiring many valuable hints. During the course of these operations nothing was overlooked, and he appeared desirous of explaining the most minute details necessary for obtaining precise results, and endeavoured to enforce the necessity for these little precautions, of which his experience had taught him the importance in analytical research. "Come," said he, "while this operation is in progress, I will show you two or three little things which, perhaps, you may not be sorry to know." And all this took place in the same day, so that I had at the same time the advantage of instruction and of passing my time in the most agreeable manner. Sometimes he showed me mineralogical specimens, amongst which he possessed some of great rarity, or else he related the results obtained by foreign chemists on the subject on which we were occupied; he would then endeavour to make me comprehend some passage which appeared obscure, or would even translate entire passages from an author whose works I could not read. Berzelius used to take private pupils, but for some time back he had relinquished the practice. The number of these pupils was very restricted, for throughout Sweden there are but eight or nine who have enjoyed this privilege, and about an equal number in Germany. Nevertheless, he liked to introduce strangers into his laboratory, and was much pleased in showing them the results of his long experience. Although apparently in the enjoyment of good health, he complained of the approach of old age. For the last two or three years his sight had required the aid of spectacles. His memory no longer served him as heretofore, and he was obliged to label all his bottles, which he had previously distinguished without this precaution.

Any stranger wishing to visit Berzelius should go by way of the *Drottning-Gattau*, at the commencement of which stands the church of Adolphus Frederick. The house forming the corner of this street is the large building lately purchased by the Academy. On approaching the house this way, he mounts two little steps which are opposite the door, and may forthwith enter: he need not fear the abruptness of his entrance, as a little bell will announce his arrival. He will discover, by the sight of various utensils arranged about the entrance, that he is in the laboratory of a chemist. If he be neither chemist nor even amateur, and is not frightened by the sight of the chemical apparatus, he will have nothing to fear from the emanations arising from them, which in most laboratories affect so sensibly the organs of respiration. Here they are all carried off by a most efficient system of ventilation, and even if any operation be in progress it may be approached without fear. To the right, adjusted with care near the window, may be seen a mercurial trough, from which the light is brilliantly reflected. Further on is a small porcelain table with raised edges, on which are probably some glass apparatus indicating the progress of certain experiments. After having glanced at the blowpipe, its large lamp, and the objects that surround it, we next arrive at the

sand-bath. It is in vain to search in this laboratory for brick or stone furnaces, which may be useful in operations on the large scale, but are not required in the delicate processes of analysis. The apparatus used by Berzelius consists of a hearth raised about three feet from the ground, and covered with a hood for carrying off vapours. On this hearth is a small sand-bath heated with charcoal, and a small iron furnace with holes for receiving tubes, retorts, &c.

In the second apartment the first object to be remarked is a glass case on a table, containing the balance. How great is the light which this fragile and simple instrument has contributed to the natural sciences! How numerous are the phenomena which it has explained, and the hidden truths which it has revealed! Who can count the discussions which it has terminated,—the hypotheses which it has destroyed? Who could have believed, in past times, that the determination of abstract truths and the development of the laws of nature would be due to the oscillations of this instrument? But examine this balance with attention, for it has rendered great service to science, and the modifications which have been made in it are of importance. The method of raising and maintaining in repose the beam and the pans is due to Gahn, whose skill in such work was well known. There are also small leaden weights, the exact counterpoise of all the crucibles and small platinum vessels of the laboratory, so that each might be readily tared. Around this room are placed in drawers or glass cases divers apparatus and chemical preparations in perfect order; and near the window is a table arranged for blowpipe operations, on which Berzelius has written an excellent treatise.

We now turn to the left, and perceive, in a third apartment, Berzelius himself, who is probably occupied in writing. His table is covered with journals and borne down with the weight of books. By his side is a small cabinet, in which are contained rare chemical products. It is here that rhodium, osmium, selenium, &c., are to be found, and he will take pleasure in showing you these and other specimens. Berzelius is constantly occupied. He works from twelve to fourteen hours daily; but, notwithstanding all he has done for experimental chemistry, it must not be supposed that he works unceasingly in his laboratory. Frequently when composing he ceases to work in the laboratory for months together. If, while writing, as in the preparation of the last edition of his work on Chemistry, he meets with any passage that appears obscure, he quits his pen, and establishes himself in his laboratory, which he does not quit until he has obtained the desired result. He then returns to his editorial labours.

His apartments are admirably arranged, so as to admit of his passing from his study into the laboratory. It is in his study that he receives his morning visitors. By the side of these apartments is a long room, in which his apparatus is arranged ready for use, so that he can commence any operation without loss of time. It is thus that he has been enabled to lay out his time and to make it of double value.—*Répertoire de Pharmacie.*

ON THE PROTEIN COMPOUNDS.

Mulder has arrived at the following conclusions after a prolonged investigation of protein :—

1. The albuminous substances hitherto examined may be regarded as a compound of $C_{36}\ H_{25}\ N_4\ O_{10}$, with sulphamid and phosphamid in different proportions. 2. Next to these are the compounds of oxy-protein $C_{36}\ H_{25}\ N_4\ O_{11}$, and $C_{36}\ H_{25}\ N_4\ O_{13}$. 3. Sulphur is not an essential constituent of the precipitate, which acetic acid produces in a warm solution of albuminous substances in caustic potash; the quantity of the same varies, and the form of the sulphur combination is $S_2\ O_2$.

THE FREQUENCY OF INQUESTS.

A MEETING was held in the vestry-room in the parish of St. Pancras, on the 19th of September, for the purpose of taking into consideration the great expense occasioned by the late increase in the number of inquests; and Mr. Harding submitted a resolution for consideration with a view of placing some restraint on the coroner, or on the beadles, who were stated to be over officious in their informations for the sake of their fees. It was also objected, that Mr. Wakley had appointed his son, a young man of twenty-two, as deputy, an abuse arising out of a late Act of Parliament brought in by Mr. Wakley himself. Mr. Brettingham moved an amendment, which appeared to be more in accordance with the sentiments of the meeting; after some discussion the motion and amendment were withdrawn, and the subject was referred to a committee.

We think great caution should be observed in placing any obstacles in the way of the duties of the coroner, especially at the present time. The prevalence of cholera affords a great facility to criminal poisoners in escaping detection. A person poisoned by arsenic, seized with vomiting and purging, and dying in a few hours, might be treated as a cholera patient, and the death might be registered accordingly, without any suspicion as to the real cause of death. There are, we admit, distinctive characters in the symptoms of the two cases. The rice-water evacuations and blue colour of the skin in cholera, with other symptoms known by medical men who have much experience of the disorder, would remove all doubt; but all not being equally experienced, an erroneous diagnosis is by no means improbable. In every case of supposed cholera, in which, on closely observing the symptoms, or on inquiry into the circumstances, the slightest cause of suspicion may be found to exist, we think not only that an inquest should be held, but the stomach should be chemically examined.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

As announced in our last number the nineteenth meeting of the Association was commenced at Birmingham on Wednesday, the 12th of September, and the proceedings terminated on the following Wednesday. The meeting, although not presenting any very striking features, was considered a good one. The members who attended were as follows:

Old Life Members	277
Old Annual Members	94
New Life Members	11
New Annual Members	32
Associates	439
Ladies	237
Foreigners	32
Total	1122

Amongst the distinguished foreigners present were—His Excellency the Chevalier Bunsen; S. Desprat, Catalonia; Drouin de l'Huys,

Ambassadeur de France; Charles Bergeron, Paris; C. L. Bonaparte, Prince of Canino; J. A. Boogard, M.D., Rotterdam; Professor G. Forchhammer, Copenhagen; G. P. F. Groshans, M.D., Rotterdam; M. S. de Lomornaix, Paris; Professor Milne Edwards, Paris; M. Ludwig Rinman, Stockholm, Sweden; W. Roscher, Leipzig; Karl Schroeder, Paris; A. Schroetter, Professor of Chemistry, Vienna; J. E. de Vry, Ph. D., Professor of Chemistry, Rotterdam; J. A. Duran, Bordeaux; George Gossleth, Trieste; C. H. Th. Kerndt, Ph. D., Professor of Mineralogy, Leipzig; Professor Gustav. Magnus, Berlin; Dr. Jules Mohl (Member of the Institute of France), Paris; V. Pisani, Lucca, Italy; W. B. Rogers, Professor of Natural Philosophy in the University of Virginia; J. E. Teschemacher, Boston, United States; T. C. Vicnot, Attaché à l'Ambassade de France.

There were also present a large number of the scientific men of our own country, including Faraday, Brewster, Murchison, Lyell, De la Beche, Buckland, Sedgwick, Miller, Playfair, Gassiot, Phillips, Daubeny, &c. &c.

The Rev. Dr. Robinson filled the office of President.

The Chemical Section was presided over by Dr. Percy; Messrs. R. Hunt and G. Shaw acting as Secretaries. There were several papers, some of considerable interest, read before this section. The first was a paper by Dr. Scoffern, "On the combined Use of the Basic Acetate of Lead and Sulphurous Acid in the Colonial Manufacture and Refining of Sugars." We may probably give a notice of this paper in our next number. There were also papers, by Dr. Wilson, "On the Presence of Fluorine in Sea-Water;" by Professor Ludwig Rinman, "On Phosphorus in Cold-Short Iron;" by W. S. Ward, "On the comparative Cost of different Voltaic Arrangements" (*see* page 191); by Mr. Claudet, "On Photography;" by M. Bontemps, "On the Colouring of Glass by Metallic Oxides" (a very interesting paper); by Dr. Gladstone, "On the Compounds of the Halogens with Phosphorus;" by Dr. Andrews, "On the Heat of Combination;" and by Dr. Forchhammer, "On a new Method of determining the Organic Matter in Water."

EXHIBITIONS OF WORKS OF ART AND MANUFACTURE.

We noticed in our last number the "Exposition" of the products of French industry, which has recently closed at Paris. There has subsequently been a similar exposition at Berlin, which has attracted visitors from all parts of Europe, and especially from different parts of Germany, the fares by railroad having been greatly reduced to encourage artisans and others to avail themselves of the opportunity of viewing the products of Prussian industry. The Prussian capital has, in consequence, been overflowing with company, and has never been known to present so gay and animated an appearance.

We have also had an exposition, on a small scale, at Birmingham, which was got up as one of the attractions to the meeting of the British Association. The Birmingham exposition contains the products of British industry; but, although much credit is due to the

committee, who got it up at a short notice, yet it has no pretensions to the character of a great national exhibition, from which the state of the arts and manufactures in this country might be estimated.

An exposition of a somewhat different character, and founded on less restrictive principles, has been projected by Prince Albert, which will offer to the manufacturers of England an opportunity of placing their productions in competition with those of other countries. It is proposed that this exposition should take place in the year 1851, in Hyde Park, and that it should consist of the productions, both raw and manufactured, including machinery, sculpture, &c., of all nations. Several gentlemen are, at the present time, engaged in visiting the principal manufacturing towns throughout the country, to elicit the opinions of manufacturers as to the feasibility of the project and the best means of carrying it out; and from the reception which the proposal has hitherto received, there can be little doubt of its successful issue. It is expected that a fund of £200,000 or more will be raised to meet the expenses of the show, including the distribution of prizes.

EXHIBITION OF DRUGS AND CHEMICALS.

At the last meeting of the Medical and Surgical Association, held at Worcester, Messrs. Lea and Perrins exhibited an extensive collection of drugs, chemical and pharmaceutical preparations, which excited some interest among the members, who passed a vote of thanks for the contribution. As this association meets annually at different provincial towns, we notice the circumstance by way of a suggestion to chemists in other localities. Any opportunities for intercourse of this kind between medical men and chemists on scientific subjects, in which they are mutually interested, are calculated to promote harmony, as well as the advancement of useful knowledge.

THE ELECTRIC LIGHT.

Paper read at a Meeting of the British Association, on the comparative Cost of making various Voltaic Arrangements;

BY MR. W. S. WARD.

The author stated that a series of calculations, founded on data produced to the chemical section at Swansea, showed that the efficient power of three generally-used forms of battery, known as Smee's, Daniell's, and Grove's, would be equal, when 100 pairs of Smee's, 55 pairs of Daniell's, or 34 pairs of Grove's were used, and that the expense of working such batteries, as regards a standard of 60 grains of zinc in each cell per hour, would be about 6*d.*, 7½*d.*, and 8*d.*, respectively.

This communication led to conversations on the economy of the electric light and electro-magnetic engines, in which Dr. Faraday, Mr. Shaw, Mr. Hunt, Mr. Elkington, and other gentlemen joined. Dr. Faraday remarked on the imperfect character of electric light, and its inapplicability for purposes of general illumination; all objects appearing dark when the eye was embarrassed by the intensity of the electric arc. Mr. Shaw and Dr. Percy instanced the magneto-electric machines which are employed at Birmingham for electro-plating, in which the current cost of the motive power, *viz.*, a steam-engine to put the magneto-electric machine in action,

was the only working cost. Mr. Elkington stated that they had never been induced to abandon the voltaic battery which they employed in their manufactory, finding it more economical than the magneto-electrical machine of which he was the patentee. He also stated the remarkable fact, that a few drops of the sulphuret of carbon, added to the cyanide of silver in the decomposing cell, had the property of precipitating the silver perfectly bright, instead of being granulated so dead as it is when thrown down from the solution ordinarily employed.

PHARMACY IN HUNGARY.

The pharmaceutical reform, which has made so much progress in the north of Germany, has not yet extended its beneficial influence into Austria. In this country, the pharmaceutists are still almost completely dependent on the medical men, and the latter appear to have been even encouraged by the local authorities in the exercise of arbitrary and despotic conduct, which they have fearlessly indulged in towards the pharmaceutical body. Thanks to the liberty of the press, which was granted in the course of last year, and to the courageous efforts of some of our brethren who asserted the rights of the body, the government has put an end to the most flagrant of the acts of injustice to which the pharmaceutists were previously exposed. Yet, although the condition of the pharmaceutists has been considerably ameliorated of late, much still remains to be done, especially in those parts of the country where the imperial government cannot sufficiently exercise its vigilance with reference to the numerous abuses which continue to exist.

In Hungary, pharmacy is really in a hopeless condition. One of the principal causes which have contributed and still contribute to lower the pharmaceutical profession, is the existence of too great a number of pharmaceutical establishments. A second cause of the great depression of the state of pharmacy in Hungary is the very small amount of remuneration obtained by its practice. But the latter condition has been an inevitable consequence of the former. We may give the following case by way of example :—

In the circle of Guns, in Eisenburg, the population of which is at most 50,000, there are thirteen pharmaceutists, which makes an average of one to every 4000, and in the capital of this circle, a town of about 6000 inhabitants, there are two pharmaceutists. Several of these establishments are in a miserable condition, having neither stove, pans, press, or distillatory vessels. They are frequently without some of the most important drugs, and yet they undertake to dispense physicians' prescriptions. At only one of these thirteen establishments is an assistant kept, the proprietors of all the others are completely tied to their shops. The annual receipts of each of these pharmaceutists, is, on an average, only 500 florins (about £54); and it may be said, without exaggeration, that the sale of birds, which in Hungary is practised in connexion with pharmacy, constitutes the principal means of support of the proprietors of these establishments.

Now, how is it possible in such cases, where the shops are in so deplorable a state—where the annual receipts scarcely exceed £54—where the pharmaceutist does not possess the necessary means of improving his position, and is hardly able with economy to procure animal food for his Sunday's dinner, how, we say, can a scientific character be maintained? It is not to be wondered at, but, on the contrary, it was natural to expect, that the means which have been adopted on three several occasions for the organization of a system of pharmaceutical instruction, have proved ineffectual. Besides, if, in spite of the evils to which we have alluded, a scientific spirit was yet maintained among the Hungarian pharmaceutists, the last vestiges

of it would speedily be obliterated through the ignorance and arbitrary acts of those in authority.

Thus, for instance, there resides in one of the capital towns a person appointed as a kind of sanitary commissioner, who, possessing no medical degree, after having served in the campaigns of 1805 to 1809, as medical assistant to the army, arrogated to himself the title of Doctor, and in 1810 was raised to the position he now occupies. This man, not content with enforcing the law in reference to Physicians and Surgeons, intermeddles with the affairs of the pharmaceutists over whom he has supervision, and in this capacity his ignorance and his arrogance are often manifested. As is often seen with those who have not regularly studied their profession, this pseudo-doctor changes his system as he would his coat; at one time an allopathist, at another a homœopathist. But there is here hidden a secret motive. Pretending that the pharmaceutists are not capable of preparing his prescriptions, and that, therefore, he can place no confidence in them, he asserts the right of dispensing his own homœopathic and allopathic medicines, thus monopolizing the triple function of physician, surgeon, and pharmaceutist, and yet one of the pharmaceutists in whom this commissioner pretends that he can place no confidence, was formerly a legalized pharmacien of Paris, and has laid himself out especially for the preparation of homœopathic medicines.

The superior authorities of the government, in reply to the numerous complaints of the pharmaceutists, who have been so shamefully supplanted in the exercise of their art, have frequently reproved this false doctor, and the magistrate of the town; but these gentlemen have been content to return the communications, and have carried effrontery to such a point, that the magistrate has not hesitated to declare in public, "although the government may send a thousand orders, we will act as we please." Can such things be credited?

About the middle of last year, a pharmaceutist residing in the circle of Guns, presented a petition to the royal government of Hungary, signed by himself and other practitioners of the country, in which the petitioners, in claiming the redress of their grievances, propose at the same time divers measures to be adopted for the amelioration of their profession. This petition produced no effect, a result which may be partly ascribed to the confusion created by political changes. It nevertheless gave rise to the abolition of the practice of visiting the shops of pharmaceutists.

The different nationalities which subdivide Hungary still exercise a fatal influence in preventing unity among the pharmaceutists. The Magyars and the Germans, respectively, sympathize only with those of their own nation. It is melancholy to see such trifling questions cause dissension among our Hungarian brethren, who, above all things, ought to understand that their welfare depends upon union and concord. They have only to look to the scientific movements which have taken place among the pharmaceutists of Germany, Belgium, France, and other European countries, to be convinced of this great truth. Individual efforts will never be productive of important results; it is only by the combination of the different members of the body that success can be ensured to the just demands for redress.

There can be no doubt that the political dissensions which still prevail in Hungary and in Austria have contributed in preventing the pharmaceutists from obtaining redress for their well-founded complaints. We may hope that in Hungary, when civil troubles have given place to a beneficial peace, the government will seriously give its attention to the domestic interests of the country, and introduce into the organization of the pharmaceutical body those reforms which are so imperatively called for.—*Journal de Pharmacie d'Anvers.*

CASE OF DIFFICULTY BETWEEN THE APOTHECARIES' COMPANY AND THE BOARD OF HEALTH.

Action against an Unqualified Practitioner.

A CASE was lately tried at Hungerford, before the County Court of Berkshire, in which a person named Bishop, who resides at Ramsbury, in Wiltshire, was charged by the Apothecaries' Company with practising as an Apothecary without being legally qualified. Mr. W. H. Rowland, who appeared for the plaintiffs, stated the nature of the case, and explained that the action was brought under the 55th of George III., chap. 194, commonly called the Apothecaries' Act, by which it is provided that it shall not be lawful for any person or persons (except persons then in practice as such) to practise as an Apothecary in any part of England or Wales, unless he has passed his examination, and received a certificate of his being duly qualified. He then adduced evidence to prove that Bishop, who possessed no certificate, had acted as an Apothecary, and furnished medicines for the use of a man named Henry Bagman, who subsequently died. Mr. Astley, for the defence, endeavoured to show that the evidence had failed in proving the charge, and raised some technical objections, which were overruled by the court. He denied that there was any proof of his client, who was a very respectable man, practising at Ramsbury as a Physician and Chemist, having compounded the medicine. The jury, however, brought in a verdict for the plaintiffs for £20, the amount claimed. This is said to be the first case of the kind which has been tried on the merits.—*Lancet.*

[This case possesses no feature of importance to Chemists, and no new principle is involved in the result. The technical objections raised were almost equivalent to an admision of guilt, one having reference to the county in which the case was tried, the other being an endeavour to throw the *onus probandi* on the plaintiff as to the want of qualification. These being set aside, the plea was simply a denial of the allegation, defendant not being, or professing to be, a Chemist.

Coupling this case and others of a similar nature, with the following order of the Board of Health to the City of London Union, an inconsistency is manifest.

"*Ordered*, That nine legally-qualified medical officers, or (in case so many legally-qualified medical men cannot be obtained for the service) advanced medical students, be forthwith appointed to give up their whole time to a regular and careful house-to-house visitation throughout the several districts of the City of London Union, at least once each day, and, if requisite, more frequently."

Now the duty assigned to these medical students is to act as apothecaries, at a salary of four guineas a week, in cases of cholera or diarrhœa, in each of which cases each one of them would be liable to a penalty of £20 if prosecuted by the Apothecaries' Company. It can scarcely be supposed that any jury would convict under the circumstances of the existing emergency, yet prudence would suggest that application should be made by the young men so engaged for a suspension in their favour of the law of the Apothecaries' Company against unqualified practitioners. Here a difficulty would arise, for, if these medical students are to be exempted, with what face could the Company proceed against qualified Surgeons or Physicians, not possessing their licence, in other parts of the country? In our opinion, any such proceedings of the Company *at the present time*, while the emergency is general throughout the country, are indecent, unfair, and impolitic.—ED.]

BOTANICAL SOCIETY OF LONDON.

Friday, Aug. 3, 1849; John Reynolds, Esq., Treasurer, in the Chair. The following donations were announced:—

The Journal of the Royal Agricultural Society of England, for July, 1849, presented by the Society; *The Pharmaceutical Journal and Transactions*, for August, 1849, presented by the Pharmaceutical Society; *Twenty Lessons on British Mosses*, by William Gardiner, presented by the Author. Dr. Joseph Dickson, of Jersey, and Miss M. Wilson, of Belfast, were elected Corresponding Members.

Mr. Jasper W. Rogers brought under the consideration of the meeting the purport of his paper read at the last meeting of the Society, on the 6th July last, "*On the Uses and Properties of Peat Moss, and the Value of Peat Charcoal as a Disinfector and Fertiliser.*" It may be necessary to mention that by the aid of peat charcoal Mr. Rogers purposes to consolidate and deodorise the solid matter of the London sewers; and whilst by that means benefiting the inhabitants of the metropolis, there would be placed within the reach of the agriculturist a manure of the most powerful description—pulverised, free from odour, and fit for transit by any conveyance. In 1845 he brought the subject under the consideration of the public, and it was then alleged that charcoal could not give that quantity of carbon to the root of the plant, the leaf and not the root being the portion which absorbed such sustenance. Often, however, since then he had tried the experiment, and the result had invariably been that the root as well as the leaf of the plant attracted the carbon, and therefore he was more convinced of the propriety of the system he had promulgated. From the experiments he had made he had found that peat charcoal possessed far superior advantages to wood charcoal; it had a deodorising effect, which wood charcoal had not; and if they considered how such an agent could be made to operate upon the sewage matter of London, no one could be left in doubt as to the public benefit. Wherever it had been used it produced most extraordinary effect. If excretia, in its natural state, was intermixed with charcoal, it at once absorbed and took up all those gases which, if exposed to the atmosphere, were lost; it kept that nutriment until such time as the dryness of the earth surrounding a plant intimated its lack of sustenance, and gave forth its revivifying influence when it was wanted. In short, by the admixture of charcoal with excretia, all the gases were at once taken up and retained, ridding the public of nuisance and disease, and giving to the land the entire benefit. Peat charcoal was, perhaps, the greatest absorbent known. It would take up and retain about eighty to ninety per cent. of water, and at least from ninety to 100 volumes of those noxious gases arising from animal excrement and other putrescent matter. Hence its great value for effecting deodorisation, and for retaining all the value of the liquid as well as its volatile products. Equal parts of prepared peat charcoal and excretia would, under almost every circumstance, if properly intermixed, produce a manure of almost incalculable value. The proportion, however, of charcoal might be more or less in some instances, even down to one-third.

Mr. John Bishop, F.R.S., inquired of Mr. Rogers, whether he was

not aware that the peat raised from the bogs of Ireland could be turned to other uses besides that he had pointed out? in answer to which

Mr. Rogers said, he could not do better than quote the following paragraph from his original paper, read to the Society on the subject. —"In its natural state peat moss had several peculiarities. It contains, in different proportions, ammonia, pyroligneous acid, tar, &c., and also a very singular production, a 'fatty matter,' which, when purified, closely resembles spermaceti, and makes a very beautiful candle. Mr. Reece has recently patented a process for the extraction of these articles; and I am happy to say a few energetic Englishmen have not feared to risk both themselves and their fortunes to commence operations on an extensive tract of bog and mineral in the county of Antrim, where they have coal as well as peat, and they purpose carrying out the production of iron from ore which is upon the property. Possibly, 'Price's Patent Candle' may yet be rivalled by 'Reece's Bog Spermacetti.' To speak seriously, the production is really beautiful, and gives a pure and strong light. The question to be solved, however, is, can it be obtained in sufficient quantities to be profitable? It is found in its natural state at times, in small quantities collected together by some peculiar local filtration, or, perhaps, affinity, which draws it from the mass around to one spot. I have seen a collection of it—a little well, I may say—of six to seven inches in diameter, containing the matter pure and about the colour of butter. The superstitious tradition of the peasantry is that the fairies hide it for their use, and hence it is called 'fairy butter.'"

Dr. Cooke and Dr. Semple expressed doubts as to the possibility of plants receiving carbon through the root, and quoted Sir Humphry Davy and Liebig to support their arguments.

Those gentlemen were replied to by Dr. Redmond, who contended "That Mr. Rogers's chemistry remained untouched by their arguments." By his proposition the plant drew up by its root carbonic acid, which the secretions converted into charcoal.

The Rev. Mr. Stoddart, and other members of the Society, having expressed themselves in terms favourable to Mr. Rogers's views of the subject,

The Chairman expressed the gratification the Society had experienced from Mr. Rogers bringing the subject before them; and the meeting then adjourned, after passing an unanimous vote of thanks to that gentleman.

REVIEWS.

The Use of the Blowpipe, *in the Qualitative and Quantitative Examination of Minerals, Ores, Furnace Products, and other Metallic Combinations.* By Professor Plattner. Edited, with Emendations, by Dr. Sheridan Muspratt, Professor of the Liverpool College of Chemistry, &c. With a Preface by Baron Liebig. Second Edition, revised and enlarged. Taylor, Walton, and Maberly, London.

Plattner's work on the use of the Blowpipe has acquired considerable reputation as a very complete and able treatise on the

subject to which it relates, and it has probably suffered no deterioration, as regards its adaptation for English Chemists, from the curtailment of some of its details, which has been made by Dr. Muspratt in editing the translation. German authors, and we therefore presume German readers, appear to have a *penchant* for minute descriptions of very commonplace subjects, which *we* should often consider trite and useless. In its present form, however, the work before us is by no means subject to this objection.

The work is divided into three sections. The first contains a brief notice of "the Blowpipe," which the editor has abridged and altered from the English edition of *Berzelius on the Blowpipe;* a description of the form of blowpipe and lamp recommended by the author; a description of the method of blowing, and of the flame; the supports and other implements used in blowpipe operations; and an account of blowpipe reagents, and the mode of preparing them, part of which, we think, might have been very well omitted.

The second section treats of qualitative analysis with the blowpipe, including a description of the general rules to be observed in operating with this instrument, and of the various reactions by which different bodies are detected. This, to the Chemist, is the most valuable part, and it constitutes the greater part of the book. Under the head of each of the alkalis, earths, and metals, the phenomena presented by the action of the flame, either with or without reagents, are described, and the mode of treating a great variety of minerals explained.

The third and last section is devoted to the description of the means of effecting quantitative analyses with the blowpipe.

To those whose pursuits and means of operation render the blowpipe the chief agent for the examination of mineral productions, and especially to the geologist and mineralogist, this work will be found one of the best that has appeared in our language. For the general purposes of the Chemist, who resorts only to this method of examination in a few isolated cases, for the determination of the general characters of a substance, or for the confirmation, in certain cases, of other tests, it would be found more comprehensive, and perhaps more technical, than would be desirable. Much time is often wasted by chemical students in practising the use of the blowpipe to the neglect of other more accurate and available means of unlocking the secrets of nature. The blowpipe, however, is a valuable, if not indispensable, aid to the Chemist in many investigations, and its use should by no means be neglected.

With regard to the manner in which the editor's duty has been performed in the translation of Professor Plattner's work, we find, in the prefatory part, the commendations of the author of the work, and of Baron Liebig. Indeed, the "Preface by Baron Liebig," to which allusion is made in the title-page, is more correctly a testimonial or certificate of merit, a species of appeal to the public which we are sorry to see is sometimes practised by scientific Chemists in a manner calculated to bring discredit upon the profession.

Our attention has been directed to several newspaper puffs, apparently emanating from injudicious friends, who, if they desire to

raise the Professor in the estimation of his scientific brethren, would do well in future to avoid fulsome compliments, such for instance as the following, which is taken from a notice of the work before us in a provincial paper; "and while we have had a Davy in Cornwall, and a Dalton in Manchester, it is probable an equally bright halo will, at a future period, encircle the name of Muspratt of Liverpool."

THE MICROSCOPIC ANATOMY OF THE HUMAN BODY IN HEALTH AND DISEASE. Illustrated with numerous Drawings in Colour. By ARTHUR HILL HASSALL, M.B. 8vo, Vol. I, *text*, pp. 570; Vol. II, *plates*, lxix. London, 1846—49.

THE appearance of the fifteenth and last Part of this useful and interesting work, enables us to congratulate the author on its conclusion, and to take a general view of the whole.

The work is divided into two parts, one treating of the fluids of the human body, the other of the solids.

In PART 1, the author successively considers the *Lymph* and *Chyle*, the *Blood*, *Mucus*, *Pus*, *Milk*, the *Semen*, *Saliva*, *Bile*, *Sweat*, and *Urine*.

In PART 2, the *Fat*, *Epithelium*, *Epidermis*, *Nails*, *Pigment Cells*, *Hair*, *Cartilages*, *Bone*, *Teeth*, *Cellular* or *Fibrous Tissue*, *Muscle*, *Nerves*, *Organs of Respiration*, *Glands*, and *Organs of the Senses*, are noticed in succession.

In an APPENDIX, various other subjects are noticed, such as the *Pituitary Gland*, *Pineal Gland*, *Pia Mater*, *Pacchionian Glands*, *&c.*, *&c.*

The author briefly but very lucidly describes each subject, and beautifully illustrates it by coloured plates.

As an example of the manner in which he handles the various topics, we shall make an extract from his article on the *Pineal Gland*, a small body in the brain, which Descartes imagined to be the seat of the soul.

"The chief bulk of the pineal gland is made up of innumerable minute granular cells, which, when carefully examined in a perfectly fresh subject, are seen to be of the caudate form, the rays of the cells being exceedingly delicate and slender, and apt, therefore, to be entirely overlooked.

"Imbedded in this cellular matrix, and, for the most part, collected in the centre of the organ, there may be noticed numerous particles of stony hardness, of various sizes, and mostly of a rounded form, and the larger of which are plainly visible to the naked eye. Of these bodies I have never encountered any satisfactory description; they are not, as generally considered, mere inorganic and earthy particles, but structures of a definite and complex organization, constituting an essential element in the composition of the pineal gland. When viewed with the half or quarter inch object-glass, the larger of these bear much resemblance to masses of fat, each being composed of numerous distinct and aggregated lesser pieces or particles, which reflect light strongly; and it is int his circumstance, as well as in their large size, that the resemblance borne by these bodies to masses of fat consists."

In this, as on some other occasions (*e.g.* p. 232) the author we suspect, erroneously uses the word "reflect" for "refract." Fatty globules, it is well known to microscopists, are oftentimes readily distinguished from other bodies by their high "refractive" power; according to our

author, they are recognised by their "reflective" power. Is not this a mistake?

We have no desire to carp at Dr. Hassall's labours; on the contrary, we are anxious to aid him. But we cannot refrain from expressing our regret that he did not make himself better acquainted with the labours of continental microscopists before he undertook the preparation of this important work.

It is but justice to the author to say, that he has spared neither trouble nor expense in the production of the present publication, the only complete one of the kind in the English language, and we have very great pleasure in recommending it to the notice of our readers. The great outlay which he must have made in preparing the beautiful plates with which the work is profusely illustrated, precludes, we are sadly afraid, the hope of the undertaking proving a very remunerative one, at least, in a pecuniary point of view.

THE ELECTRO-CHEMICAL CAUSES OF CHOLERA AND OTHER COMPLAINTS, *as engendered and conducted by Damp, Filth, Cesspools, and City Churchyards; with the best means of freeing Towns from Ozone, and other Emanations of pent-up Sewers and Drains.* By SIR J. MURRAY, M.D., Edinburgh and Dublin. Dublin: James M'Glashan, 21, D'Olier Street. W. S. Orr and Co., London and Liverpool; Oliver and Boyd, Edinburgh.

TO CORRESPONDENTS.

A Subscriber.—Grove's battery is the one which answers best for the electric light. The plates are made of zinc and platinum, the wires of copper.

A. K. T.—Elaine may be obtained in a state suitable for watchmakers, by exposing olive oil to a low temperature and pressing.

A Constant Reader.—Without practical experience, which we do not profess, it would be impossible to give the particular instructions desired for dyeing the silk.

B. C.—Our correspondent in Paris did not send a drawing of the pill-moulds. We are not aware that they possess any advantage over the pill-machine for general use.

P. P.—The mixture of chloride of lime and tannin for the purpose alluded to would be absurd.

A Registered Apprentice (omitted last month).—Cold affusion is recommended in cases of poisoning with prussic acid; but we are not aware that the addition of the salts would be any advantage. The action of prussic acid is so rapid that there is in general no time to apply a remedy.

Juvenis (Chichester).—The letter H is accidentally omitted in the cut; but it is obvious from the description where it ought to have been.

F. C.—The mistake appears to have been quite accidental; not a wilful substitution.

M. N.—It will most likely be several months before the work alluded to is completed.

A. P. S.—We are not aware of the composition of "Brande's enamel for the teeth."

A.—The still cannot legally be used without taking out the licence, which is 10*s.* 6*d.* a year.

L. B.—It is not improbable that the Excise would interfere if the medicinal wines, described by Dr.Butler Lane, were adopted to any extent.

M. P. S. (York).—We have received the specimen, which is curious.

W. C. (York).—Mr. Redwood, in his Supplement to the Pharmacopœia, gives several formula for Lugol's Solution of Iodine.

H. P.—Fownes's Manual of Chemistry.

Newcastle-on-Tyne.—The enclosure has been received. It confirms what we have already stated on the subject.

M. P. S. (Norwich)—The ammoniacal liquor of the gas-works contains carbonate of ammonia and hydrosulphate of ammonia. These are decomposed with hydrochloric acid when hydrochlorate of ammonia is formed. On evaporating the liquor this salt may be crystallized out in an impure state. It is subsequently purified by sublimation.

Hermes.—A new edition of *Phillips's Mineralogy* will shortly be published, which, we believe, will be the kind of book our correspondent requires. It will of course comprehend Crystallography.

Hirudo.—(1.) For the detection of alum in bread, treat a portion of the bread with cold distilled water, and filter the solution. Test for sulphuric acid with a soluble salt of baryta, and for alumina with solution of sal ammoniac and ammonia. If alumina be thrown down, it will be soluble in *liquor potassæ*, and when heated in the oxidizing flame of the blowpipe with a little nitrate of cobalt it assumes a beautiful blue colour.—(2.) The substance sold as urn-powder is sesquioxide of iron.

Zoile.—Persesquinitrate of iron, see Vol. vii., page 596. *Eau de Cologne*, see Vol. iv., page 243 of this Journal.

Alpha, M. P. S.—(1.) We think the addition would not be an improvement.—(2.) No.—(3.) We believe such an apparatus is kept by Knight, of Foster Lane.—(4.) Such an extract would not answer the purpose.—(5.) We do not know it.

C. J. P.—We have not very carefully examined the specimen; but we see no reason to doubt its being the salt for which it was sold.

The Potato Disease.—We regret to learn that this disease has again appeared in some parts of Ireland. A friend of ours informs us that, after an absence from home of a few days, he found several fields, which he had left in flourishing condition, entirely blighted with the disease which had suddenly come on. A peculiar state of the atmosphere was observed at the time, similar to that which was noticed on the former appearance of the disease. We hope to receive more specific information on the subject.

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the Editor, 338, Oxford Street, before the 20th of the month (if Answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. IX.—No. V.—NOVEMBER 1st, 1849.

SECRET POISONING.

The crime of murder has prevailed in all ages since the fall of man. In the first instance this was effected by physical violence and the shedding of blood. The advancement of civilization has led to the discovery of other methods of effecting the object—methods less brutal and more diabolical. Murder is not now confined to cases of sudden impulse or ungovernable passion. The modern assassin adapts his expedients to the refinement of the age, bringing to his aid the appliances of science, and often masking deliberate treachery under an assumed pretence of affectionate attentions. In this manner the systematic poisoner, while ministering to the sufferings of the victim, continues secretly to aggravate those sufferings until the object is accomplished.

To frustrate these schemes of the educated and accomplished villain would be difficult—perhaps impossible; but the crime is often perpetrated in a less artful manner by persons over whom some restraint might be placed, by diminishing the facility with which destructive agents notoriously used for such purposes may be obtained. The relation too often proved to subsist between burial-clubs and rat-poison is a disgrace to human nature; and while it is known that there are in the world persons so depraved as to poison their children for the sake of the burial-fees, the subject assumes an importance which demands the attentive consideration of the profession and the public.

Considering the various sources of danger to which the public are exposed from the careless and criminal use of poisons, doubts have been entertained whether any practicable remedy could be contrived for an evil of such magnitude. The late discussions among the members of the Medical and Pharmaceutical bodies afford grounds for believing that something may be done to diminish it, and we trust the proposed joint committee will be successful in bringing forward a report in a tangible form for the consideration of the Legislature. If the Medical profession and the Chemists can agree upon such a report, there will be no reason to fear any opposition in the event of the subject coming before the House of Commons in the form of a Bill.

THE BOARD OF HEALTH AND THE CHURCHYARDS.

The Board of Health appear to be determined to carry their eccentricities with them to the grave. Their directions respecting certain burial-grounds are novel, although the idea upon which they are founded is not original. The said burial-grounds are (according to the recent order) to be covered with a layer of not less than three inches of quicklime, excepting the pathways and the parts already

covered with flat stones; and in each grave the coffin is to be deposited on a layer of the same material. Not more than one corpse is to be buried in any grave, unless a stone or brick grave, &c. If in digging any grave any human bone or other part of a human body, or fragment of a coffin, shall become visible, the earth is to be immediately filled in and covered with a layer of three inches of quicklime in addition to the general layer of three inches of the same substance. Every coffin shall be at least five feet below the surface and two feet six laterally from every other coffin. The latter regulation is an indirect prohibition of intramural interment, rendering unnecessary the chemical process of disinfecting with quicklime. The object of this expedient is to absorb the noxious gases emanating from the bodies beneath the surface, for which purpose the grave-yard is to be desolated and converted in wet weather into a drab swamp, and at all times covered with a compound of dirty lime. Not a particle of grass or other vegetation is to be permitted, although this is the natural antidote for animal exuviæ, the elements of which constitute the food of vegetables. This, however, is too refined and poetical an idea for the Board of Health, who adopt in preference the example of the Bermondsey murderers, and ordain that every corpse interred shall be provided with a winding sheet of the same material as that in which the unfortunate O'Connor was enveloped.

Not satisfied with applying the plaster to the sore—throwing the lime into the trenches or other offensive spots—the Board of Health convert their remedy into a nuisance by spreading it all over the ground, and inflict this penalty upon fourteen grave-yards before they have fairly tested the experiment on one. The use of lime as an antidote to noxious animal compounds is a fair subject for experiment. Charcoal might also be tried for the same purpose, and there may be other means worthy of consideration. But whatever may be the substance employed as a disinfectant, the surface of the ground should be covered with a layer of earth, which would not diminish the efficacy of the chemical agent, while it would prevent the unnecessary nuisance now in contemplation.

The revolting method of desecrating churchyards, by burning up the natural green turf with quicklime, is in accordance with the caustic anathema of the Board of Health against fruit and vegetables, as well as other necessary and wholesome articles of food—an order implying a distrust of the wisdom and beneficence of Providence, and calculated to add the miseries of starvation to the dangers of pestilence. We are fully persuaded that if this order, and the instructions for the general use of opium as a family medicine, had been literally obeyed, the mortality occasioned by the Board of Health would have exceeded that which has arisen from the cholera.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

WEDNESDAY, OCTOBER 10th, 1849.

MR. SQUIRE, PRESIDENT, IN THE CHAIR.

The Chairman stated, that the first business of the evening would be the Distribution of the Prizes which were awarded to students in the classes of Materia Medica, Chemistry and Pharmacy, and Botany, during the last session. He felt gratified in being the organ through which the handsome and valuable books before him were to be conveyed to those pupils who had honourably distinguished themselves in their professional studies.

The questions for examination, and the successful competitors, were as follows:—

MATERIA MEDICA,

EXAMINER, DR. PEREIRA.

1. Give a brief botanical description of the natural orders *Algæ*, *Lichenes*, *Iridaceæ*, and *Umbelliferæ*. Enumerate the officinal substances which these orders respectively yield.
2. Draw a parallel between the barks of Cinnamon and *Cassia lignea;* mention the names and places of growth of the trees yielding them, and point out the physical and chemical characters by which these barks are respectively distinguished.
3. Describe the physical agency by which the bursting of the ripe fruits of *Momordica elaterium* is effected, and the mode of extracting the elaterium of the shops. Name the organic constituents of this substance, and the mode of separating them.
4. What is the botanical origin of the extracts known in commerce by the names of *Catechu*, *Terra japonica*, *Cutch*, *Gambir*, and *Kino?*—how are they obtained?—what parts of the world are they brought from?—and what is their chemical composition?
5. What are the chemical characters which respectively distinguish the mucilages of acacia-gum, tragacanth, quince-seed, and dextrine.
6. Mention some medicinal seeds whose albumen possesses acrid or poisonous qualities.
7. Describe the appearance which a slice of potato presents under the microscope, both before and after boiling, Give a sketch of the process for extracting potato-starch, and compare it with that followed in the preparation of wheat-starch. Describe the microscopic appearance of the grains of potato-starch, pointing out the characters by which they are distinguished from *tous-les-mois*.
8. Enumerate leaflets of which Alexandrian senna is constituted, and point out the characters by which they are respectively distinguished.
9. How would you proceed to detect powdered cantharides in a mixed powder?
10. Name the substances marked 1, 2, 3, and 4.

[*Candidates are allowed the use of a microscope, and may illustrate their Answers by sketching the objects they describe.*]

Prize.....Mr. Thomas Trask, 7, Camden Road Villas.
Prize.....Mr. Edmund Greaves, 17, Bloomsbury Square.

CHEMISTRY AND PHARMACY.

EXAMINER, MR. REDWOOD.

1. *Filtration.*—Enumerate the substances used as filtering media ; describe the methods of using them ; and mention cases in which they are individually applicable.
2. *Tinctures.*—Describe the different processes by which tinctures are prepared, naming any tinctures which are best prepared by any particular process.
3. *Calcination and Sublimation.*—Describe the methods of effecting the sublimation of sulphur, calomel, benzoic acid, and indigo ; and the preparation of red precipitate and sesquioxide of chromium by calcination. State the conditions upon which the more or less crystalline state of the products will depend.
4. *Oxygen, Chlorine, Phosphorus, and Cyanogen.*—Their mode of preparation, properties, and principal compounds.
5. State the composition of starch, dextrine, cane sugar, grape sugar, alcohol, aldehyde, acetic acid, acetone, oxalic acid. Explain the mutual relations of these bodies, and the changes which occur in the production of some members of the group from others.
6. Explain the terms *isomerism* and *allotropy*, with illustrations.

First Prize .. .Mr. Edmund Greaves, 17, Bloomsbury Square.
Second Prize...Mr. Augustus Bird, Hornton Villa, Kensington.

Certificates of Merit...1. Mr. Joseph James Sessions.
" " 2. Mr. C. R. Quiller.
" " 3. Mr. George Dymond.

GENERAL AND MEDICAL BOTANY.

EXAMINER, MR. BENTLEY.

VIVA VOCE EXAMINATION.

The following plants were submitted to the candidates, who were required to name them—to state the natural order to which each belonged—to mention the medical and economical properties of each—and to describe any peculiar feature in any of the plants.

Delphinium Staphysagria, Aconitum Napellus, Aconitum paniculatum—Papaver somniferum, Chelidonium majus—Malva sylvestris, Althæa officinalis—Ruta graveolens—Agrimonia Eupatoria—Conium maculatum—Bryonia dioica—Valeriana officinalis, Centranthus ruber—Pyrethrum Parthenium, Anthemis nobilis, Cnicus benedictus, Cichorium Intybus—Knautia arvensis—Convolvulus Scammonea—Symphytum officinale—Mentha viridis, Mentha piperita, Mentha Pulegium—Solanum dulcamara, Solanum nigrum, Atropa Belladonna, Hyoscyamus niger, Datura Stramonium—Rheum palmatum, Rheum Emodi, Rheum Rhaponticum—Cannabis sativa, Parietaria officinalis—Veratrum album—Acorus Calamus.

WRITTEN EXAMINATION.

Questions to be answered.

1. Describe the several forms of Vascular tissue in plants, and mention the tribes and organs in which they respectively occur.
2. Describe the structure and mode of growth of the stems of Monocotyledonous, Dicotyledonous, and Acotyledonous plants.
3. What are the characters which distinguish a Root, a Rhizome, a Tuber, a Cormus, and a Bulb ?
4. Describe the course of the Sap, and the changes, physical and chemical, which it undergoes during its progress through the plant.

5. Describe a Stipule, a Bract, a Spathe, an Involucre, a Cupule, and a Perianth.
6. Describe the meaning of the terms *centrifugal and centripetal inflorescence.* Mention the varieties of inflorescence which belong respectively to each, and describe and give examples of the following kinds, viz., a Raceme, Spadix, Amentum, Corymb, Umbel, Panicle, and Cyme.
7. Describe the three chief modes of valvular dehiscence of the Fruit, and give the structure and examples of the following kinds of Fruits: Legume, Achenium, Follicle, Capsule, Pyxis, Berry, Siliqua, Silicula, and Cone.
8. Describe the structure of the Ovule before and after fecundation.
9. What is the difference between an Arillus and an Arillode; also between a Seed and a Spore?
10. Describe and mention the Sub-classes into which Exogens are divided in the Natural System of De Candolle.
11. Give the diagnoses of the following Natural Orders: Papaveraceæ, Cruciferæ, Leguminosæ, Umbelliferæ, Compositæ, and Solanaccæ. Mention the medical properties of each natural order, and name the medical plants which they respectively yield.
12. Distinguish the Melanthaceæ from the Irideæ, Amaryllideæ, and Liliaceæ.

First Prize.....Mr. J. S. Walker, Worcester.
Second Prize .....Mr. C. R. Quiller, Helston.

Certificates of Merit...Mr. Edmund Greaves.
" " Mr. T. L. Miller.

The Chairman directed the attention of the meeting to the following Donations, which had been made to the Museum and Library of the Society:—

From T. M. Stone, Esq, *of the Royal College of Surgeons.*—Specimen of Woorari poison, and fifty poisoned arrows, from Pirara, near Fort San Joaquim, on the Rio Branco.

From Mr. P. J. Cookes, *of Salisbury.*—Specimen of earth, with blue vein, from the centre of a tumulus near Salisbury.

From Mr. W. G. B. Gunton, *New Keston Street, Borough.*—Concretion from the stomach of a horse.

From Mr. John Savory.—Specimen of Sumbul Root.

From Mr. Simkin.—False Ipecacuanha—Ipecanga Root from Rio Janeiro.

From T. H. Kent, Esq., *Staunton, Suffolk.*—Dried specimens of Hyoscyamus niger—Conium maculatum—Digitalis purpurea—Aconitum napellus—Datura stramonium—Ruta graveolens—Lactuca virosa—Atropa belladonna—Solanum dulcamara—Cichorium intybus.

From Mr. Giles Yarde, *Lamb's Conduit Street.*—Copy of Scott's Commentary on the Bible, in six volumes.

The Chairman then observed that the next subject for consideration was

THE SALE OF POISONS.

Mr. Jacob Bell said the subject had been introduced to the members of that Society on behalf of the Provincial Medical and Surgical Association by Dr. Tunstall, of Bath, who had drawn up a series of Questions (published in the last number of the *Pharmaceutical Journal*), with a view of ascertaining what practical means could be adopted for preventing the frequent accidents and crimes resulting

from the unrestricted sale of poisons. These questions were chiefly confined to arsenic, that being the poison used in a majority of the cases detected; but it was also worthy of consideration whether, in the event of some measures being decided on, these measures should not include some other poisons. It must be evident to all that something ought to be done, since, in the present state of the law, every person calling himself a Chemist and Druggist might sell every kind of poison to any person applying for it. Poisons were also sold by grocers, oilmen, and hucksters, especially in the country. Some advantage might result from the restriction of the sale of these dangerous substances to medical men and Chemists and Druggists; but, in order to make the law effectual, it would be necessary to introduce another law, defining who is a Chemist and Druggist, and providing for the education and examination of those who assume that name. By carrying out this provision, for which object chiefly the Pharmaceutical Society was founded, more benefit would be conferred on the public than by an imperfect plan relating to any particular poison. It would be well for the meeting to consider the sale of opium as well as arsenic, this being sold to a large extent in some of the manufacturing districts, both in the crude state and in the form of child's cordial, by which children were poisoned by wholesale, as proved before a late Parliamentary Committee. Other poisons also deserved attention, as the family poisoners, if deprived of one agent, would be likely to find out another; and the newspapers would soon instruct the uninitiated in the art, through the medium of reports of inquests and police reports. The question before the meeting related to the retail sale of poisons, especially arsenic, the wholesale use of arsenic for manufacturing purposes placing it beyond the jurisdiction of the Pharmaceutical body. Mr. Bell had been informed that one house in London had sold in three years upwards of 4000 cwt. of arsenic. This, however, was not the view of the subject which claimed so much attention; it was the sale of arsenic by retail, for poisoning rats and other vermin, which was the most fertile source of accident and crime, and for this purpose, it might be affirmed, arsenic was unnecessary. The subject was very properly introduced to the members of the Pharmaceutical Society, as it was desirable to protect the public by some judicious regulations without placing inconvenient restrictions on Chemists and Druggists in their ordinary and legitimate business.

Dr. Tunstall stated that the subject under discussion had been brought before the notice of the Provincial Medical and Surgical Association by Dr. Toogood, of Torquay, late of Bridgewater, and that it had excited much interest on account of the serious evils proved to exist under the present defective laws. There was no doubt that arsenic was indiscriminately sold for the ostensible purpose of destroying vermin. This was particularly the case in Lincolnshire, and other places where many of the secret poisonings had taken place. The precaution of requiring a witness was not effectual, as it often happened that the vender was not acquainted either with the purchaser or the witness. The use of arsenic for rat poison was certainly unnecessary, and this was the pretext usually resorted to by those who purchased it with criminal intentions. It was also used for agricultural purposes, for steeping wheat, and for dressing sheep; and in manufacturing districts for dyeing, and in various other processes. The use of arsenic for

dressing sheep was attended with considerable danger. He was informed that the sheep frequently died after the arsenical dressing, and there was no doubt that they were sometimes slaughtered while under the influence of the poison which had been absorbed. Dr. Brett, of Liverpool, had detected it in the stomach, liver, and spleen of a woman who had died from the application of an arsenical plaster, and it was a remarkable fact, that arsenic, however administered, produced inflammation of the stomach. It was important for the profession to investigate the effects of this arsenical dressing on sheep, and particularly on their flesh, as sold for human food. The use of arsenic for steeping corn was much to be deprecated; it was an unnecessary risk, as sulphate of copper answered much better. Among other evils attending the practice, partridges and other birds were sometimes poisoned, and the fact was brought to light by the dangerous consequences resulting from eating such birds. There could be no doubt that the frequent use of arsenic for these and other purposes afforded great facilities to the suicide, a circumstance which was confirmed by the Registrar-General's report.

From the answers already received from different parts of the country to the questions which he had drawn up, Dr. Tunstall was confirmed in the opinion that, for most of the purposes above named, arsenic was unnecessary, and that a judicious restriction on its sale, instead of being objected to as an inconvenience, would be considered by Chemists to be rather a relief from an onerous responsibility. (The doctor quoted several of the answers, which confirmed this view of the case.) An idea had been thrown out that in one respect arsenic possessed an advantage, namely, that it was easily detected by chemical tests, and that other poisons might be used which chemistry could not recognise, which would increase the difficulty of bringing offenders to justice. Dr. Tunstall did not admit the force of this argument, observing that arsenic, when administered in almost homœopathic doses in the manner practised by systematic poisoners, produces a disease which could scarcely be distinguished from gastritis arising from natural causes, and, being cumulative in its effects, the patient sank gradually into a state of decay, the process of poisoning occupying several weeks or even months. He considered that great responsibility would rest on the profession if means were not taken to check this disgraceful crime, and that equally strenuous endeavours should be used to throw obstacles in the way of the suicide, who, if unable to obtain his object by the easy method afforded by poison, would be driven to the razor, the rope, or the river—an alternative which in many instances would deter him from the commission of the crime. The sale of poisonous drugs should be restricted to the adult, including every drug that had been used for criminal and suicidal purposes, and their sale confined exclusively to the Druggist; the huckster and grocer being prohibited from keeping it as an article of sale under heavy penalties. By this means the suicide would be driven to those means which require no external agents, and many an upright man would be saved the pain and regret attendant upon the knowledge that he had innocently supplied the means of death, and he would be in a position to refuse, with an undoubted authority, the supply of a poisonous or destructive agent. Among the answers received from the country some astounding facts had been stated in reference to other poisons as well as arsenic. A

correspondent in Lincolnshire stated that he sold annually, by retail, from 50 to 100 gallons of laudanum, besides morphia, strychnia, bichloride of mercury, and a considerable quantity of arsenic. A correspondent in Manchester informed him that the sale of Godfrey's Cordial was carried on by the small grocers to a large extent, and that there was a demand for arsenious acid, oxalic acid, and other poisons. In Leominster there was a great demand for corrosive sublimate. Under these circumstances, he thought the safety of the public demanded some stringent regulations. The effect of a Chemist's licence would be, that the sale of poisonous drugs would be taken away from those who were so ignorant as to mistake laudanum for tincture of rhubarb, and oxalic acid for Epsom salts, and who sent out poisons generally in unlabelled bottles. The effect of the present system in the manufacturing districts was shewn by the Registrar-General's return, from which it appeared that in seven years the deaths in Manchester, arising in a great degree from the pernicious practice of drugging children in that city, were 16,000 more than in the county of Surrey, although the population of Surrey considerably exceeded that of Manchester. The existing evils might be materially diminished, if not prevented, by a vigorous and united effort on the part of the Medical Profession, aided by the Pharmaceutical Chemists, whose influence in such an undertaking would be conducive at the same time to their own advancement, by promoting the improved system of education which they had been for some years engaged in introducing.

Dr. Tunstall was glad of the opportunity of discussing the subject with the Members of the Pharmaceutical Society, from whom he hoped to receive further information in reply to the questions which he had drawn up on the sale of poisons.

The Chairman expressed what he was persuaded was the sense of the Meeting, in offering the thanks of the Society to Dr. Tunstall for his valuable suggestions, and also for having brought forward a question in which all the members were practically interested. He thought it was incumbent on the Society to co-operate with the doctor and his colleagues in the undertaking which they had commenced with so much spirit, and he hoped that the Members individually would assist by offering any suggestions that might occur to them. He took the opportunity of noticing a form of register for the sale of poisons adopted by Messrs. Hitchcock, of Taunton, who had forwarded a copy. It contained columns for the names and addresses of the purchaser and the witness, the name of the poison, and the purpose for which it was wanted.

Dr. Sibson, having been deputed by Dr. Toogood to introduce his proposition respecting poisons to the Association at Worcester, and having also been one of the Committee appointed on that occasion, felt much interested in the inquiry which had been undertaken, and thought the Members of the Pharmaceutical Society by joining in it would promote the good work in which they had been engaged, namely, the education and improvement of the character of their Members. He felt that the profession at large had reason to feel indebted to that Society for the advancement which had already taken place in pharmacy, and for the groundwork which had been laid for the introduction of a legislative enactment for the regulation of that

r anch of the profession. With reference to the proposed investigation n the sale of poisons, he thought this would be more efficiently conducted by a committee than by an individual, and suggested the appointment of a joint committee of the Association of which he was a member, and of the Pharmaceutical Society, which joint committee should collect a mass of evidence, to be made available when the question was in a state to be brought before Parliament.

The Chairman said he felt assured the Council of the Society would be disposed to acquiesce in his proposition, to which Dr. Tunstall also gave his assent, observing that he should be happy to make any information which he had collected available to the Committee.

Dr. Ure agreed with the observations which had been made by Dr. Tunstall and Dr. Sibson, as to the great importance of the subject then before the Meeting, and the necessity there was that some steps should be taken for placing the sale of poisons under legal restrictions. With reference to the particular poison to which allusion had principally been made, namely, arsenic, he thought its use might very well be dispensed with for all purposes for which it was sold by retail. For destroying rats, mice, and beetles, phosphorus was much more effectual, and was, in fact, unobjectionable. As a dressing for sheep, arsenic ought not to be used, and for steeping corn it was equally objectionable, while sulphate of copper was unobjectionable and answered better. He thought it was full time that the Government should do something towards checking the practice of secret poisoning which had become so prevalent.

Mr. Edwards was decidedly opposed to the plan which had been suggested, of granting licences to Druggists to sell poisons. This would be giving a legal sanction to their sale, which would increase rather than diminish the evil at present existing. He could not see the necessity for the sale of arsenic by retail, and thought a direct prohibition would be attended with neither difficulty nor inconvenience.

Mr. Carden (a Barrister) said that, his attention having been directed to this subject a few years ago, he had maturely considered the various means which had been proposed for checking the evils resulting from the present indiscriminate sale of poisons. He thought that any measure which was adopted might very properly be made to apply only to arsenic, as that was the poison used in nearly all the cases of poisoning. He suggested the registration of every sale of arsenic and every application for it at the nearest police-station, by which means, if a person applied for it and was refused, and afterwards obtained it at another shop, the two transactions being made known would afford a clue to investigation by the police, and by this means it would be notorious to all the inmates of the house that arsenic had been purchased, which would be a check on family poisoning.

Mr. Waugh considered that any regulations giving a legal sanction to the sale of poisons would be calculated to increase rather than diminish the evils at present existing. A licence would be particularly objectionable. In fact, why should arsenic be sold by retail at all? It was not necessary, and by its entire prohibition the trade would be relieved from a great responsibility.

Mr. Pedler concurred in disapproving of the licence. He thought, if licences were granted under legislative sanction, that those who now refuse to sell arsenic at all would find a difficulty in adhering to that determination, and the sale of the poison would therefore be increased.

He adverted to the suggestion that, in those cases in which arsenic was sold for legitimate purposes, it should always be mixed with vermilion or some other colouring matter.

Mr. Redwood said that, reference having been repeatedly made, during the discussion, to the legitimate use of arsenic for certain manufacturing purposes which were not specified, the Committee, in carrying out the object they had in view, would do well to make it a particular subject of inquiry, what are the processes in which arsenic is used, and might not a substitute be discovered for this objectionable ingredient in some or all of such processes? The statements which had been made that evening fully confirmed the opinion he had formed from many years' experience in the drug trade, that arsenic need not be sold at all by the retail Chemist and Druggist.

It was decided *nem. con.* that the subject should be referred to the Council, with a view to the appointment of a committee.

TRANSACTIONS OF THE LIVERPOOL ASSOCIATION.

ROYAL INSTITUTION, COLQUILL STREET, FRIDAY EVENING, SEPT. 28, 1849.

THE PRESIDENT IN THE CHAIR.

Dr. Nevins gave his first *Lecture on Specific Gravity*, embracing liquids only. After some introductory remarks, the doctor pointed out the practical difficulties arising from capillary attraction—the importance of temperature—and the necessity of testing the bottles in ordinary use in order to ensure accuracy; and, to illustrate the subject, went through several operations and worked the results. He then explained the principle of hydrometers, *viz.*, the "upward pressure of liquids," which he also illustrated by many neat experiments; and, on concluding his instructive lecture, postponed entering into the second part of his subject, *viz.*, Solids, until the next meeting of the Society.

HYDRO-CARBON, OR WATER-GAS.

Mr. Trumper then read a paper on the Hydro-carbon, or Water-gas. He believed some opposition had been shown to this gas on the ground that it was not a new, but a well-known and old invention. Now he was not prepared to enter into the claims of the patentee to originality, or to discuss its scientific bearings; but simply to give the result of his experience for some months past, during which he has made it for his own consumption. The apparatus consists of two retorts contained in a large iron box, one for the decomposition of water, the other of resin and common oil. The first retort is divided by a partition, which reaches to within four inches from the bottom. One division is hollow, and the other surrounded by charcoal and filled with scrap iron; upon this the water drops in from a syphon-pipe and is decomposed. The hydrogen is set free, and the oxygen combining partly with the carbon forming carbonic oxide, and partly with the iron forming peroxide, the mixed gases then pass off into the hydraulic main. The second retort is similarly partitioned and partly filled with iron chain, in order to extend the surface. Upon these the resin and oil drops through a syphon-tube (which was originally bent, but Mr. Trumper had found a straight funnel-tube far more useful, and adopted it), and a gas rich in carbon is the result, chiefly bicarbide of hydrogen, but mixed with secondary products; some of the resin seems to be carried over with a volatile oil; these pass into the hydraulic main, where they mix with the gases from the other retort, and together pass into a "cooling-box," and through a series of long upright pipes dipping into water. This frees the gas from ammonia, resinous or pitchy matter, and a considerable quantity of naphtha, which appears to be pyroxillic spirit. After this

purification the gas passes at once into the gasometer. After making three or four times, sufficient resinous matter collects in the cooling-box to furnish a new supply of gas without additional resin. Mr. Trumper's gasometer contains sixty cubic feet, and is so much too small as to destroy the economy of the operation in a great degree. For this quantity of gas, which comes over in about three-quarters of an hour, he uses 4lbs. resin, 2lbs. water, 6lbs. oil or grease—this costs 4*d.* On the whole, he calculates, it costs him nearly 5*s.* per 1000 feet; but as he is obliged each time to stop the operation almost as soon as it is thoroughly heated, on account of his gasometer being full, so large a waste results that he thinks he could fill one four times the size with the same quantity of ingredients, and reduce the cost to 1*s.* 6*d.* or 1*s.* 8*d.* per 1000. On the large scale of course its expense would be much less on account of the value of the by-products, but even at this rate it is invaluable to Chemists unprovided with coal-gas, or only obtaining it at a high rate.

It is equal in luminous and heating properties to the coal-gas, and devoid of sulphur and other unhealthy impurities ; its odour is hardly perceptible, but sufficiently so to detect any escape ; and its colour is brownish. On the whole, his experience of it has been highly favourable, and he would recommend all those who have the convenience to make a trial of it.

Mr. Waldie stated, that he considered it was no invention on the part of the patentee, for he found in *Knapp's Chemical Technology* a full description of the process, invented by Selligue, which appeared to him nearly identical. It consisted of three retorts, two of which decomposed water by charcoal, and the gases H and CO passed at once into the third retort, containing iron chains, upon which bituminous slate oil, or any resinous oils, were dripped; the richly carbonized gas from the oil was diluted with the other gases, so that no deposition of carbon took place on the chains. This gas was said to be twice as brilliant as coal-gas, but the author did not see upon what principle that could be. Mr. Waldie said the same objection had occurred to him, as it was generally found that the illuminating power was increased by adding carbon; hence gases were naphthalized, and the light thereby increased. He also observed, that the only difference he saw in the two processes was, that Selligue's appeared the more perfect of the two.

Mr. Edwards said, that in the manufacture of resin oil, to which he had referred at a former meeting, the resin-gas was produced in large quantity, and wasted as a by-product;—this being the case, he thought that the economy of the process on a large scale was beyond dispute ; and as the supply of resin seemed at present equal to any imaginable demand, he expected this gas would in all probability supersede the impure coal-gas ; he had seen it burning at Mr. Trumper's, and, though he did not think it produced so white a light as the Liverpool gas, he had no doubt that on the large scale it would be prepared equally pure. He had seen at a meeting of the Liverpool Philosophical Society a sample of naphtha, exhibited by one of the patentees (Mr. Wakefield, of Nottingham), which was distilled from the contents of the cooling-box, and he considered it a very valuable product, and, as it was produced in some quantity, likely to reduce the cost of the gas considerably.

Mr. Mercer thought this contained more olefiant gas and less light carbide of hydrogen than the ordinary coal-gas, and considered its application extremely advantageous where labour was not a consideration, and expected its adoption in all workhouses, prisons, and public buildings, where it could be easily worked.

Mr. Trumper said it required no skill in working, and he generally intrusted it to his errand-boy, whom he found quite equal to the task.

Dr. Nevins said that the light was dependent, not only upon the actual consumption of the carbon, but on its being heated to incandescence before

being consumed: he therefore thought that the admixture of the hydrogen effected this, while the carbonic oxide, by diluting it, extended its surface so effectually as to render the carbon *white* hot, and hence its brilliance.

Mr. Mercer then exhibited two chlorine generators—the first by Smith, in which manganese salt and sulphuric acid are used; the second by Heathfield and Burgess, who employ manganese and hydrochloric acid. The latter has the advantage of great simplicity, while it is very effectual. Mr. Mercer then read a paper on "The Nutmeg Plant," of which he exhibited a preserved specimen of the fruit, presented to the Society by Mr. Rawle. Having noticed its botanical characteristics, he passed to its geographical and commercial history, giving an interesting account of its cultivation, and its monopoly by the Dutch, &c., and concluded by pointing out its value as a remedial and dietetic agent.

The Secretary said the best thanks of the Society were due to Dr. Nevins for having kindly offered to give a few morning lectures, and he hoped that those young men who found it difficult to attend in the evening would gladly avail themselves of these opportunities. Dr. Nevins would resume his lecture on Friday evening, the 26th of October, when a paper from Dr. Muspratt was also expected.

He begged to call the attention of the Members to the works of the Cavendish Society, which he handed round, and cordially recommended them to the support of all who desired a good scientific library at a very moderate expense. The works spoke for themselves, and would, he was sure, be highly prized by all who possessed them.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE COMMERCIAL VARIETIES OF GINGER.

BY JONATHAN PEREIRA, M.D., F.R.S.

In the preparation of the third edition of my *Elements of Materia Medica*, I have had my especial attention drawn to the different commercial varieties or sorts of the several articles of the Materia Medica, amongst many others to those of ginger. Perhaps the following notice of the varieties of ginger now met with in the English market may not be uninteresting to some of the readers of the *Pharmaceutical Journal*.

I have met with ginger in three different states in the English market, namely, in the fresh state, forming what was termed *green ginger*; secondly, in the state called *preserved ginger*; and, lastly, *dried ginger*, the usual form in which it is sold by grocers and druggists.

1. GREEN GINGER.

Small parcels of this have been brought over from Jamaica. The samples which I have met with were soft, and had the character of rhizomes which had been recently taken out of the ground. I am informed that in a commercial point of view they were worthless, most of them having perished on the journey. Recently none has been imported.

2. PRESERVED GINGER.

As this is chiefly used as a condiment and dessert, it will be unnecessary to describe it. Two sorts are now in commerce.

1. *Jamaica Preserved Ginger.*—This is the finest imported. It comes over in jars (seldom in barrels) of various sizes. Its value is 3*s.* per lb. duty paid.

2. *Barbados Preserved Ginger.*—This is not so fine as the preceding,

and is seldom imported, say perhaps only once in two years. It comes packed in jars. Its value is from 2*s.* to 2*s.* 3*d.* per lb.

3. *China Preserved Ginger* is large but stringy. It is generally imported in jars of about 6 lbs. each, seldom in barrels. Its value is 1*s.* 6*d.* per lb.

4. *China dry Preserved Ginger* has been sliced before preserving. When preserved it is packed and imported in boxes. It is not often brought into the London market.

3. DRIED GINGER.

General Description. — The *dried rhizome*, called in commerce *ginger-root* (*radix zingiberis*), occurs in flattish, jointed or branched, lobed, palmate pieces, called *hands* or *races*. The largest rarely exceed four inches in length. The larger, bolder, and plumper the races, the more they are esteemed in commerce.

Some of the commercial sorts have not been deprived of their *epidermis*, which is dried on them, and give the races a shrivelled character. Other sorts have been carefully scraped and peeled while in the green state. The first are said to be *coated*, or *unscraped;* the second *uncoated*, or *decorticated*, or *scraped*. Considered with respect to the presence or absence of the coat, the commercial sorts of ginger may be thus arranged:—

Uncoated or Scraped.	*Coated or Unscraped.*
Jamaica Ginger.	Barbados Ginger.
New Malabar "	Old Malabar "
New Bengal "	Old Bengal "
	African "

Although the colour of ginger is an important consideration in determining the commercial value of this root, it is difficult to describe in words the different colours which characterise the various commercial sorts of ginger. The terms *white* and *black* ginger formerly in use merely mean that some sorts are paler or whiter, others darker or blacker; but absolutely white or black ginger is of course unknown. But the different sorts of ginger pass almost insensibly from the one into the other, so that it is impossible to refer them absolutely to the pale or dark sorts. Mr. Faber tells me that, were he to classify them according to their external colour, it would be thus:—

Grey or Dark.	*Intermediate.*	*Bright Yellow or Pale.*
Old Bengal.	Barbados.	Jamaica.
New Bengal.	Old Malabar.	New Malabar.
	African.	

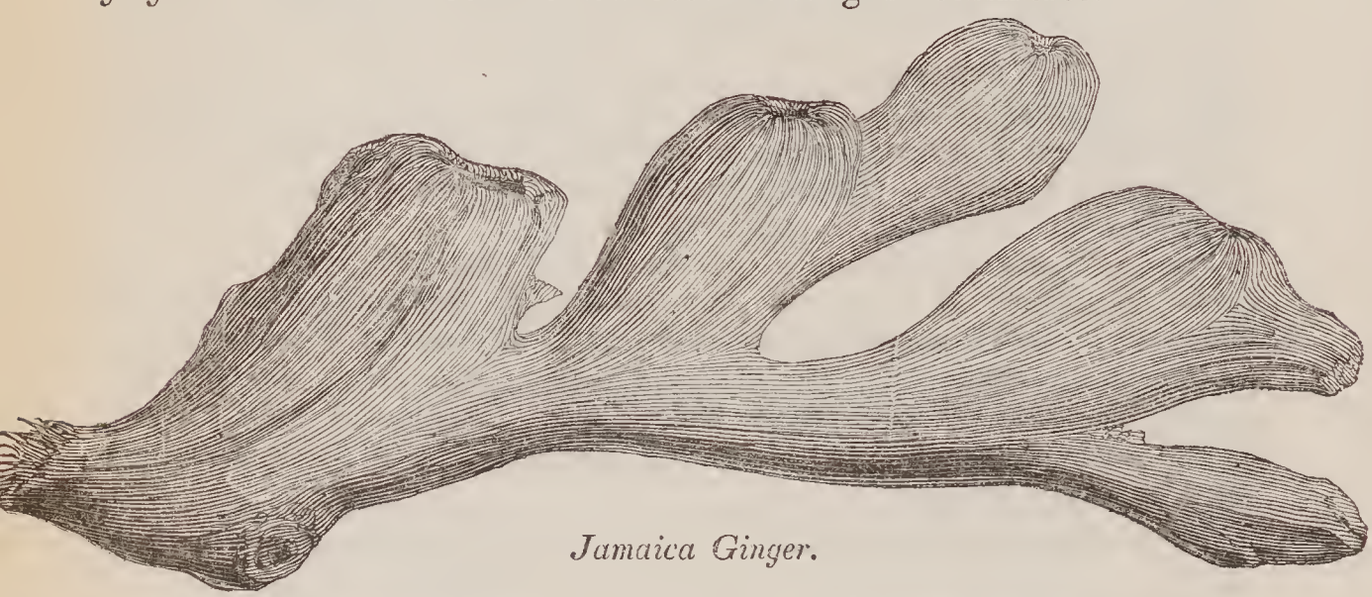
The internal colour of ginger and its softness or hardness, as observed by cutting it, is another important character. The brighter and paler the colour, and the softer the texture, the more highly is ginger valued. Ginger which is dark and hard, or flinty to the cut, is of inferior value. A transverse section of the larger and more perfect pieces shows an outer, horny, resinous-looking zone, surrounding a farinaceous centre, which has a speckled appearance from the cut extremities of the fibres and cuts.

Varieties.—Several varieties of ginger are met with in English commerce. These we may conveniently arrange according to the countries producing them, in three classes: 1st, West Indian; 2ndly, East Indian; 3rdly, African.

1. *West Indian Gingers.*

This division of gingers includes two sorts, Jamaica and Barbados, which may be taken as the types of all other sorts of ginger. Unlike the East Indian kinds, they are rarely wormy.

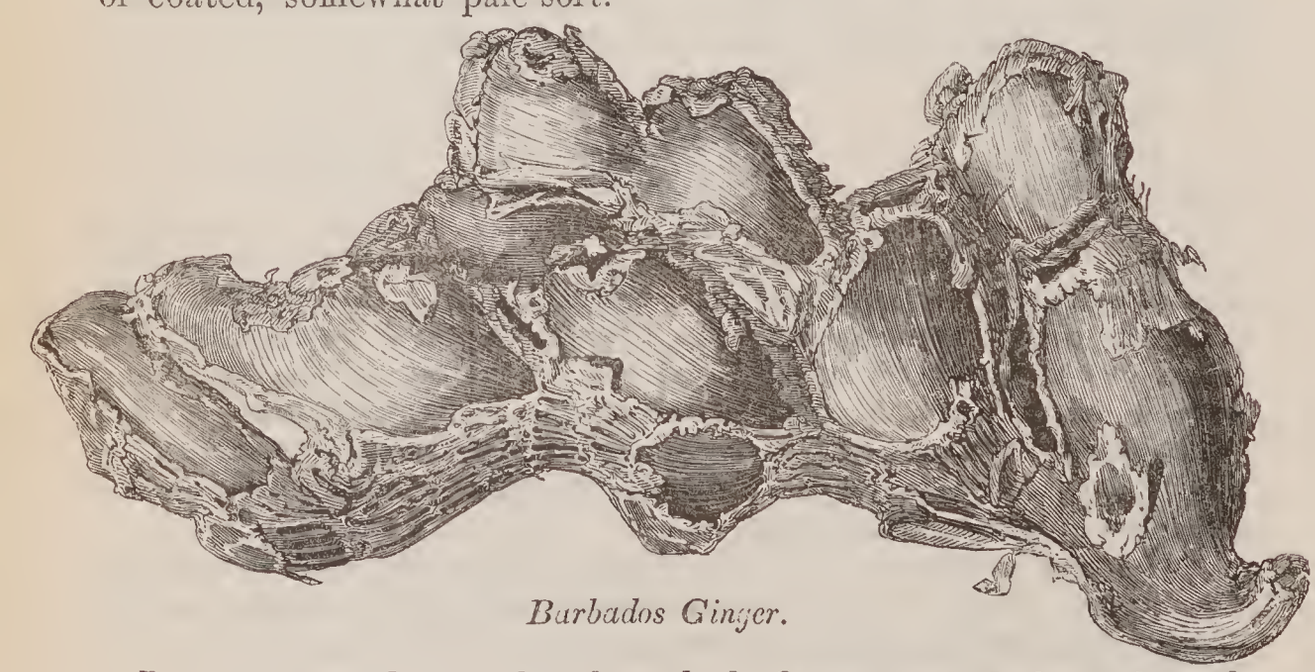
1. Jamaica Ginger (*radix zingiberis Jamaicensis*).—The sort of Jamaica ginger now found in commerce was formerly called *white ginger*, to distinguish it from an unscraped sort, which was termed *black ginger*. The latter does not now occur in English commerce.



Jamaica Ginger.

Jamaica ginger is imported in barrels holding one cwt. each. It is a scraped or uncoated pale sort. When of fine quality it consists of large, branched, plump, and fleshy soft races, whose texture is fibrous and mealy, and which externally are yellowish white or pale buff, and internally when cut present a bright but pale tint. Inferior samples consist of small shrivelled races, which have an ash-grey tint externally, present a brownish colour internally when cut, and have a hard or flinty texture. Good Jamaica ginger yields a beautiful bright straw-yellow, somewhat buffy, powder.

2. Barbados Ginger (*radix zingiberis Barbadensis*).—This is imported in bags of about sixty or seventy pounds. It is an unscraped, or coated, somewhat pale sort.



Barbados Ginger.

Its races are shorter, less branched, flatter, and darker coloured than Jamaica ginger, and are covered with a corrugated epidermis.

(*To be continued.*)

ON MEDICINAL WINES.

BY BUTLER LANE, M.D.

(*Continued from page* 175.)

I now have to speak of those medicinal wines individually, in the use of which I have most experience, and to point out that which I have found the best method of preparation.

Vinum Sennæ.—This may be made from a cold or hot infusion of the senna-leaves; but I much prefer the former. The senna should be digested in two separate quantities of water, twenty-four hours with each, the leaves being well strained and pressed. The infusion may be made in the proportion of that of the Pharmacopœia, or double the strength; and there must even be less water than accords with either calculation, so as to admit the addition of the sugar without too much increase of bulk. Should too much fluid be obtained, the proceed of the second digestion may be evaporated by a gentle heat, so as to reduce the quantity within the necessary limit. If a sweet preparation be desired, the gallon must contain at least four pounds of sugar. I am much inclined to prefer the lower temperature for the fermentation of senna wine; it renders it somewhat more tedious, but much more perfect and permanent. The atmospheric air must be gradually more and more excluded as the fermentation subsides.

I can speak highly of senna wine as an efficacious and agreeable aperient; in a sufficient dose it acts efficiently by itself, and almost always without occasioning the slightest nausea or griping, even though uncombined with any carminative. Saline matter is not very soluble in the wine; but I usually find that the addition of neutral sulphate of potash will materially augment the cathartic action. The senna wine is exceedingly palatable, and no child will object to the sweet preparation. It keeps admirably when well prepared; I have had some in use which had been made six months, and had undergone no deterioration.

Vinum Rhei.—This is best prepared by repeated maceration of the drug in boiling water, and should be of the strength of one in sixteen, which is four times stronger than that of the Pharmacopœial infusion. The gallon should contain three pounds of sugar or more for a sweet preparation. It is rather difficult to obtain the wine clear, but it keeps well, and is a most efficient and useful preparation. There is a great amount of deposit during the fermenting process. I obtained two and a half ounces of residuum from one pound of East India rhubarb, but I have found this fæcal matter almost inert. The wine answers all the purposes of rhubarb in a solid form, and is far more convenient and less nauseous.

Vinum Aloes.—I make it of the strength of one to ten with the addition of sugar, myrrh, liquorice, and saffron, in the following proportions: Barbadoes aloes, 12 ounces; liquorice, 12 ounces; myrrh (bruised), 8 ounces; saffron, 2 ounces. These materials are to be digested in seven and a half pints of water, with the aid of a gentle heat; the liquid is then to be strained off through fine canvas, and, a pound and a half of sugar being added, it is ready for the fermenting process. This is an elegant preparation, not so unpleasant to the taste as might be expected, and is very effectual as a stomachic and aperient.

It acts mildly, and does not gripe, probably owing to a large proportion of the resinous matter being got rid of. The wine of aloes will be found a desirable substitute for the compound decoction, to the action of which it closely assimilates.

Vinum Ipecacuanhæ.—This must be made by treating the recently-bruised root with hot water, and straining off the infusion so as to get rid of the ligneous matter. A full proportion of sugar must be used. When the fermentation has gone to a sufficient extent, a small quantity of spirit of wine should be added in order to arrest further action, which is apt to assume an acetous character.

Vinum Gentianæ. — The gentian wine is an exceedingly genial and efficient stomachic, and is obtained with much facility. It may be prepared of the same strength and with the same adjuncts as the Pharmacopœial tincture, and requires three pounds of sugar in the gallon for its fermentation.

Vinum Valerianæ, Vinum Calumbæ, Vinum Serpentariæ.—I have prepared these wines of the same strength as the tinctures; they very obviously possess the properties of the drugs, and effectually represent the respective constituents.

Vinum Cinchonæ.—This is an agreeable preparation, and appears to retain within it all the virtues of the bark. It should be made of the same strength as the simple tinctures of the Pharmacopœia, with at least three pounds of sugar in the gallon. After sufficiently long infusion and coction, the woody matter will be found to remain perfectly tasteless, and the sediment thrown down after fermentation is so likewise, presenting a resinous character, and when treated with acid affording no trace of crystalline matter. The wine of bark is a very valuable preparation. It, however, takes a long time to mature perfectly, and improves materially by keeping.

Vinum Opii.—The wine of opium is easily prepared. It may be made the same strength as the tincture, and I think that sugar should be used in more than the average proportion, say four pounds in the gallon. The opium is to be repeatedly macerated in hot water for some days, and the fluid extract strained through fine canvas; the sugar is then to be added, and the liquid submitted to fermentation in the usual manner. I feel certain that the Pharmaceutist may with confidence recommend the wine of opium to the notice of the prescriber. In common with others who have given it a trial, I certainly find it in the highest degree efficacious, and am often able to substitute it for morphia, when the effects of the tincture of opium are decidedly objectionable. I have carefully examined that portion of the opium which remained unstrained in the first place, but could detect no traces of morphia, though the presence of narcotine was apparent. When dried and powdered I have also administered this matter to the extent of scruple doses, but it evidently exerted no anodyne influence, though in some instances there was a stimulating effect, indicated by increased warmth of skin and fulness of pulse. The residuum which subsides after the fluid has undergone fermentation has a resinous character; its microscopic and chemical examination does not discover the presence of morphia, though it demonstrates that of narcotine.

Vinum Conii.—This may be prepared the same strength as the tincture. I have used it in affections of the lungs, &c., and have found

it equivalent in its action to the extract; and some which had even become acetous did not appear at all to have lost its medicinal power.

Vinum Digitalis.—I have made this of the same strength as the tincture, and find it a most efficacious preparation, evidently retaining the active principle of the drug in a perfect state of solution.

Vinum Hyoscyami.—Though exceedingly desirous to obtain a thoroughly good preparation of henbane, I cannot say that I have succeeded to my satisfaction. Whether the peculiar chemical composition of the plant interferes with the fermenting process, I am unable to ascertain. In some trials, I separated as much as possible of the mucilago-albuminous matter which had become coagulated, both before and during fermentation, but still the result did not answer my expectation.

Vinum Catechu, *Vinum Kino.*—These may be made the strength of their respective Pharmacopœial tinctures, but without any aromatic adjuncts. They are very pure solutions of tanic acid, and are certainly preferable in many respects to the infusions or tinctures.

I may now repeat, that from a careful examination of the various preparations which I have made, and the review of notes which I have taken respecting them, I am convinced that it is always preferable to effect the fermenting process at the lower temperature which I have mentioned, between 55° and 65°. I also feel confident that it is desirable that the atmospheric air should be excluded as soon as possible, its free admission, even at an early period of the fermenting process, tending to induce acetous action; thus, when the liquor is once placed in tubs or jars, it should on no account be disturbed, and the vessels should be closed as soon as possible, leaving a mere vent-hole for the escape of gas. I would suggest whether the introduction of sulphuret, bi-tartrate, chlorate, or carbonate of potash, at a proper stage of the fermentation, might not produce an effect analogous to the formation of tartar in grape wine, and so tend to the perfection of the fermenting process.

It can be readily calculated that the medicinal wines possess much advantage in point of economy over the tinctures; half a gallon of spirit of wine is a material item of expense in the preparation of a gallon of tincture, in comparison with a few pounds of sugar; and though some trouble and inconvenience (especially at first) may be experienced in the manufacture of the medicinal wines, yet they will be much more available than infusions and decoctions, being equable in strength, and not liable to spoil and waste.

In addition to my own testimony in favour of the efficacy of the fermented preparations, I may mention that Mr. Allan and Dr. Shelley of Epsom are now constantly in the habit of using them, and speak of them in the highest terms. Dr. Golding Bird has also done me the favour to try the wines of opium, aloes, and senna at Guy's Hospital. He acknowledges them to be excellent and efficient preparations, and that, though made many months, they were in perfect preservation. He questions, however, whether they may not be open to the same objection as the old cerevesiæ, namely, being liable to turn sour; but if the simple chemical principle be properly applied, and thorough fermentation effected, I see no reason to expect it, and can fairly appeal to the results of my experience.

I shall now leave my suggestions in the hands of the pharmaceutical

profession. No doubt the method of preparing the medicinal wines which I have described is susceptible of much improvement, and I hope that I may be successful in inducing others to turn their attention to the subject. I feel assured that the Pharmaceutist who makes it his study will find his advantage therein; and that, when a sufficient degree of uniformity and perfection is obtained, the medicinal wines will not fail to assume the character of popular medicines, as well as to recommend themselves strongly to the notice of the prescribing physician.

Ewell, Surrey.

ON THE AVA ROOT OF THE SANDWICH ISLANDS.

BY W. HAMILTON, M. B.

It is so many years since I read the interesting narratives of Captain Cook's enterprising voyages that I only retained a faint and imperfect recollection of the Ava of the Sandwich Islands, as a plant whose root produced, by a process described, I believe, by Cook, an intoxicating liquor, the inebriating properties of which excited the natives almost to frenzy, and were, I believe, among the proximate causes of the melancholy catastrophe which prematurely closed the brilliant career of that great navigator's valuable discoveries. Not dreaming, however, of its possessing any redeeming qualities to compensate its injurious effects upon society, I did not deem it worth the trouble of investigation, nor, although from our intimate acquaintance with those islands and their productions, since the melancholy catastrophe to which I have alluded, the Ava plant must have been long since familiar to every botanist, am I acquainted with the slightest particulars respecting its botanical history or classification.

In the hope of obtaining, through some of the readers of the *Pharmaceutical Journal*, the information of which I am so lamentably deficient, I venture to intrude upon their notice a brief account of its medicinal properties, taken from the extract given by Captain Beechey in the 120th and following pages of the second volume (octavo edition) of his narrative of the voyage of the *Blossom*, from the journal of Mr. Collie, the scientific surgeon of that ship.

Mr. Collie acquaints us that he had an opportunity of witnessing its effects upon

"A gentleman, a foreigner, who had undergone a course of it to remove a cutaneous affection, said to have been similar to St. Anthony's fire. It had affected at different times almost every part of the body, going from one place to another, but had been particularly obstinate in one leg. He took two doses a day, of half a pint each, one before breakfast and one before dinner, by which his appetite was sharpened, and by the time he had finished his meal a most pleasing state of half-intoxication came on, so that he was just able to go to his couch, where he enjoyed a sound and refreshing sleep.

"About the second or third week the eyes became suffused with blood, and the cuticle around them began to scale, when the whole surface of the body assumed the appearance above described. The first dose is continued for a week or so, according to the disease, and then gradually left off. The skin clears at the same time, and the whole system is highly benefited."

Such is Mr. Collie's account of the medicinal effects of this root in a case, it must be admitted, of a somewhat intractable erysipelatous

eruption, in which he had an opportunity of personally watching the progress of the cure. But he relates another case, of a still more severe description, in his own practice, in which its curative properties were still more decidedly manifested. His statement is as follows:—

"I recommended the *Ava*, and had an opportunity of seeing the first effects upon a man affected with chronic superficial ulceration, affecting the greater part of the toes and the anterior part of the soles of the feet. The legs and feet were œdematous and swelled; the pain was very distressing, preventing any sound repose, and not permitting him even to lie down, or bring them up so as to be near a line horizontal with the body. The ulcers were covered with a tough, viscid, dark-coloured discharge, that adhered to the surface, and entirely concealed it. His frame was emaciated, pulse quick and irritable, appetite gone, tongue dry and reddish. He had taken mercurial preparations at two previous periods, as he said, with considerable benefit; but, for want of the medicines, it was stopped when the sores were nearly healed. He had been, and I believe still was, addicted to drinking spirituous liquors. The *Ava* was given three times a day, with *the same immediate effects* as before mentioned; and, *at the end of ten days*, the ulcers were clean and healing. *From the commencement of the course he had been able to lie down*, allowing his feet to hang over the bed-side; he had slept soundly, and his appetite was good. Could he have procured a suitable dressing for the ulcers, with appropriate support for the œdematous extremities, I have no hesitation in saying that the plan would have succeeded. Even with all these disadvantages, I am inclined to believe that a cure will be effected if he abstain from liquor."

Both these are extreme cases, in which the powers of the *Ava* were put to the severest test; and, although the recovery in the latter was not as complete as could have been wished, still the results were satisfactory in the highest degree, and the counteracting influences fully account for the partial failure.

"A course of this root," as Mr. Collie observes, "is most beneficial in renovating constitutions which have been worn out by hard living, long residence in warm climates, *without*, however, *affections of the liver*, and by protracted chronic diseases; more especially if the disorder be such as, by the humoral pathologists, would be attributed to an attenuated or acrid state of the blood."

The *Ava* is, I believe, found in most of the intratropical islands of the Pacific, although the Sandwich Islands are, perhaps, its most extreme northern limit. Those, however, who are familiar with the narratives of voyagers in those seas can correct me if I am in error. From Mr. Collie's account it would appear to be a suitable remedy for many of those cutaneous and glandular affections which are common in tropical climates, and frequently baffle the utmost exertions of medical skill, and only give way on a removal to colder regions: such, for example, as *Frambœsia*, or the Yaws, a complaint closely resembling the sibbens of Scotland, and often difficult of cure. Elephantiasis, also, a complaint so frequent in the island of Barbados* as to have obtained for the enlargement of one or both of the lower extremities, which has given it its nosological appellation, the vernacular name of the Barbados leg, and which is generally regarded in the West Indies as nearly incurable, is another in which a course of

* This, and not *Barbadoes*, is the correct orthography.

the Ava root might, perhaps, be tried with advantage. But there is yet another complaint still more deplorable, and even more intractable, than either of these, to which it would appear to be singularly adapted; and I am only surprised that no attempt has been hitherto made to naturalise it in islands which, from the similarity of their climate, seasons, and geographical position, appear singularly suited to its cultivation. The disorder to which I allude is leprosy, one of the most deplorable under which humanity can labour, and from which no class of society is favoured with exemption.

To these may be added the joint evil, a malady chiefly confined to the blacks, if not peculiar to them, and a vast variety of herpetic and other cutaneous eruptions, which are frequently most obstinate in resisting every effort made for their removal.

The introduction of this plant into our islands might ultimately lead to its adoption in our British Pharmacopœia, and thus augment the number of remedies placed at the disposal of art for the relief of the sufferings of humanity. It would thus add to the number of imports from those islands, and, by diversifying the products of agriculture, benefit at once the planter, the merchant, and the importer.

14, *Octagon, Plymouth, 27th September*, 1849.

RECENT IMPROVEMENTS IN THE MANUFACTURE AND REFINING OF SUGAR.

In a brief notice of the meetings of the British Association at Birmingham, in the last number of this Journal, we alluded to a paper read before the Chemical Section by Dr. Scoffern, "On the combined Use of the Basic Acetate of Lead and Sulphurous Acid in the Colonial Manufacture and Refining of Sugar." This process has been made the subject of a patent; and as it has attracted some attention in this country, while another process, not very dissimilar, has created a degree of sensation among manufacturers on the Continent, we have thought that a description of these proposed improvements may be interesting to some of our readers.

DR. SCOFFERN'S AND MR. SIEVIER'S PATENTS.

Dr. Scoffern's patent is dated December 7th, 1847; and the specification was enrolled on the 7th of June following. The invention relates to the employment of sulphurous acid as an agent for the separation of lead from solutions of sugar which may have been purified thereby.

In refining sugar, according to the patentee's process, the raw sugar is dissolved in a pan, and basic acetate of lead, in the proportion of about forty grains to every pound of sugar, being added, the mixture is kept at a temperature of 180° Fahr. for five minutes; it is then left to repose for about fifteen minutes, when, on examination, a curdy brown precipitate will be seen gradually sinking to the bottom, and leaving the liquid above in a greater or less degree of transparency. The syrup is now filtered through bags, and is received into copper vessels. It will be found to contain a quantity of lead, for the separation of which sulphurous acid gas is passed through it. The patentee states that the precipitation of the lead by this means is complete. He recommends that, before the use of the gas is suspended, the filtered liquor should be tested for lead with solution of sulphuretted hydro-

gen, or sulphuret of ammonium. The lead being thus removed, the saccharine liquor will still retain free sulphurous acid and the acetic acid originally in combination with the lead. It is now rapidly heated to 180° Fahr., and chalk or powdered marble added to neutralize the acid. After concentrating it to a proper degree it is either crystallized at once, or further purified with animal charcoal.

In applying the process for the refining of cane-juice, the latter is first neutralized with lime or chalk, and the basic acetate of lead then added in the proportion of 150 grains to the imperial gallon of juice. The subsequent parts of the process are conducted in the same manner as in the case previously alluded to.

The efficacy of basic acetate of lead for the purpose for which it is used in this process cannot be doubted; and if the subsequent removal of the excess of lead from the solution can be completely ensured by the means specified, the process will probably possess some important recommendations, especially in the manufacture of sugar from the juice of the cane or beet-root. In the discussion which took place on the subject at the Birmingham meeting, two objections were urged to the process;—first, that although a Chemist, in operating in his laboratory, may completely remove lead from its solution by means of sulphurous acid, yet that the workmen employed in the manufacture of sugar would be likely occasionally to be less successful; and, secondly, that acetate of lime would necessarily be left in the molasses.

Whatever the merits of this process may be, it appears that there are two claimants for the discovery of it. Some months before the date of Dr. Scoffern's patent, Mr. Sievier took out a patent for certain improvements in the manufacture of sugar. This patent was sealed on the 12th of July, 1847, and specified on the 12th of January, 1848. Among other substances proposed to be used for purifying and decolorizing saccharine solutions, is mentioned diacetate of lead, the excess of which is directed to be removed by passing a stream of sulphurous acid gas through the liquor. This process, and that patented five months afterwards by Dr. Scoffern, are, in fact, identical.

The circumstances of this case have been subject of conversation among scientific men for several months past. We are informed that Mr. Sievier, after taking out his patent, required, as is usual in such cases, the services of a professional Chemist, to perfect the details of the invention before entering them in the specification. A period of six months is allowed by law for this purpose; and in this instance Dr. Scoffern was the Chemist employed, at a salary of about fifteen shillings a-day, for making the necessary experiments, which were conducted at Mr. Sievier's house. The result of this transaction was that the confidential assistant subsequently claimed the most important parts of the process as his own, and proceeded to take out a separate patent for them. We refrain, for the present, from offering an opinion upon the justice of this claim, but believe it will, ere long, be contested in a court of law.

M. MELSEN'S PATENT.

We pass now to the notice of the other process to which we have already alluded as having excited considerable interest on the Continent. This process is the invention of M. Melsens, a Professor of Chemistry at Brussels. It consists in the use of bisulphite of lime, which is added to the juice of the cane or beet-root, for the twofold purpose of preventing fermentation, and of separating, by coagulation,

most of the colouring matter and azotized principles which are always present. M. Melsens states that he had found many metallic oxides and salts, especially the diacetate of lead, to be perfectly efficacious in removing those azotized constituents of the juice with which fermentation originates; but he thinks that lead could never be safely introduced into a manufacturing process such as that of sugar. He was, therefore, induced to seek some other agent which might be equally efficacious without possessing the deleterious properties of the salt of lead, and he conceives that he has found such an agent in the bisulphite of lime. This salt is formed, according to Liebig, by saturating an aqueous solution of sulphurous acid with carbonate of lime. It exists only in solution, and M. Melsens uses one the specific gravity of which is 1.075. Of this solution he adds about four parts to one hundred of the juice of the beet-root; and in operating upon the sugar-cane he uses one part of the solution to one hundred parts of cane.

The solution of bisulphite of lime is represented to possess the following valuable properties:—

1st. It is a most effectual antiseptic, preventing the production and the action of all ferments.

2nd. From its great avidity for oxygen, it counteracts any tendency to oxidation in the juice to which it is added.

3rd. It is an excellent clarifying agent, causing the coagulation of all albuminous or coagulable substances when heated to 212° Fahr.

4th. It decolorizes those colouring matters which pre-exist in the juice of the cane or beet-root.

5th. It prevents the production of colouring matter which would otherwise be formed in the juice in the process of evaporation to which it is submitted.

6th. It affords the means of neutralization for those acids existing naturally in the juice, which are injurious to the sugar, while the sulphurous acid, which in such case would be set free, is almost inert.

Hitherto, in the manufacture of sugar from the cane, a very imperfect system of expression has been adopted, by which not more than one-half, or two-thirds at the most, of the juice is obtained. This portion is obliged to be rapidly evaporated, or fermentation would speedily commence, and much of the sugar is thus destroyed or rendered uncrystallizable. The part left in the cane might be extracted by means of water, but in tropical climates the tendency to fermentation precludes the possibility of recovering the sugar from such dilute solutions. It may be considered, therefore, that not more than one-half of the sugar originally present in the cane is obtained in a good and saleable condition.

M. Melsens recommends an entirely new method of proceeding. The canes, instead of being merely crushed as heretofore, are rasped. About one per cent. of the solution of bisulphite of lime is now added, which prevents any change from taking place. The rasped canes are pressed, and water with a little of the bisulphite of lime is added to the marck, and the pressure repeated once or twice, so as completely to extract the sugar. The liquors thus obtained are, in the next place, heated to the boiling point, when coagulation takes place, and the juice is thus defecated and decolorized. So completely unalterable is the solution said to be while there is any of the bisulphite present,

that it is proposed to effect the evaporation spontaneously by the heat of the sun. The whole of the sugar is thus obtained, and nearly all of it in the crystallized state.

HYPOTHESES OF THE CAUSE OF CHOLERA.

1. *The Ozone Hypothesis.*—A few weeks since Mr. Robert Hunt broached, in the *Athenæum*, an hypothesis of the cause of cholera. He asserts, that for several months past we have had to endure an atmosphere of low electrical intensity, deficient in ozone, an agent which he assumes would remove or alter pestilential miasma. His hypothesis is founded on a series of unsupported assumptions and on illogical reasoning. First, he assumes that the tension of the atmospheric electricity had been low; but even admitting this, has not the same condition existed thousands of times before without inducing cholera? He assumes the presence and important functions in the atmosphere of an agent (ozone), the existence of which has never been proved, and is not admitted by the best Chemists of the present day. Ozone may be put very much on a par with phlogiston; and, like this, is, we believe, a nonentity. Mr. Hunt's assumption that cholera-poison is a constant ingredient of the atmosphere, but that in healthy seasons it is rendered innocuous by the disinfecting powers of ozone, shows the author's profound ignorance of the phenomena of epidemic diseases. We are surprised that so intelligent a man as Mr. Hunt should presume to write on matters about which he is so little informed; and are astonished that the *Athenæum* should give place to his wanderings.

2. *The Fungus Hypothesis.*—The hypothesis which has more recently occupied the attention both of professional men and the public, is what has been absurdly enough called the "*Fungoid Theory of Cholera;*" that is, a theory of cholera which is like a fungus!

Messrs. Brittan and Swayne, of Bristol, have announced their discovery of organic annular cells in the cholera vomit, the rice-water evacuations, and in the air of cholera districts. Those in the atmosphere are said to vary in diameter from $\frac{1}{10000}$th to $\frac{1}{3000}$th of an inch; those of the cholera vomit from $\frac{1}{8000}$th to $\frac{1}{5000}$th of an inch; and those in the rice-water evacuations from $\frac{1}{6000}$th to $\frac{1}{500}$th of an inch. Such is nearly the pith of the facts on which this "fungoid" hypothesis has been built up.

It is assumed by Dr. Budd and others, that the organic cells of the atmosphere, of the cholera vomit, and of the rice-water evacuations, are the three stages of development of the same body; that this body or cell is a living organism; that it is a fungus, or of a fungoid nature; that it is disseminated in the air, in contact with the food, and in the drinking water of infected places; and that being swallowed it multiplies itself in the alimentary canal, and produces the flux and its consequences, which together constitute the disease called Cholera.

On these hypothetical assumptions we would merely observe, that some of them are unsupported by a shadow of fact, and others are opposed to the known phenomena of the disease. It is to us surprising that well-informed professional men, who are neither fungi-

logists nor even botanists, will undertake to determine what are and what are not fungi.

From anything we have yet seen or heard it appears to us impossible to decide whether these cells are of an animal or vegetable nature. To call them fungi or fungoid bodies, or spores of fungi, is to adopt a most unwarrantable assumption. No connexion has yet been traced between the cells of the air, of the vomit, and of the alvine evacuations; nor between any of these cells and cholera. No evidence has yet been offered of the poisonous character of these cells; no physical lesion produced by their growth in the alimentary canal has yet been discovered. The invariable presence of these cells in the air of infected districts, and their invariable absence in healthy districts and in healthy seasons, have yet to be proved.

To assume that the flux is the cause of the other symptoms of cholera is an entire mistake. The flux is not even an invariable condition, and certainly does not, in many cases, precede or bear any proportion to the intensity of the other phenomena. Any hypothesis, therefore, which assumes the action of a poison in the alimentary canal and the production of flux as the first link in the chain, must be erroneous. All that we have yet seen of cholera leads us to the conclusion that the cause or poison is in the blood: the flux is only one, and not even an essential one, of the consequences of the action of this poison on the system.

In refusing to admit the crude speculations which form what has been called "the fungoid theory" of cholera, we are not bound to offer any explanation of the origin of the cells, the presence of which has given rise to this hypothesis. We may observe, however, that the existence of organic cells in the vomit and alvine evacuations of cholera might have been expected. Diseased and irritated surfaces produce abundance of organic cells, as in pus, mucus, &c. That the cells of cholera discharges should be different from those of other secretions might also have been anticipated; for the disease which produces them is a peculiar one. Of the existence of myriads of organic cells, both vegetable and animal, in the atmosphere, we have no doubt; but of the specific relation of any of these to cholera not a tittle of evidence has yet been adduced. We have had abundance of speculation, but few facts.

*** Since the preceding remarks were put in type, Mr. Busk, the President of the Microscopical Society, has announced that the different organic cells above referred to have no connexion with each other; but that those found in the matters passed from the system are derived from the bread eaten by the patients, and consist of a species of *uredo* common in bread, of small particles of the inner membrane of wheat, and of particles of wheat starch!

THE NATURAL HISTORY OF THE CINCHONAS.

Extracted from a work on this subject by M. Weddell.

In 1843, M. de Castelnau, having been commissioned by the French government to undertake a scientific expedition into the interior of the provinces of Brazil and Peru, the Museum of Natural History of Paris appointed M. Weddell to join the expedition, with special instructions to investigate several important botanical subjects, and other branches of

natural history. After conjointly prosecuting these investigations for two years, M. Weddell separated from M. de Castelnau, on the confines of Mattogrosso, in order to pursue his researches in another direction, and these researches he continued until 1848. The question of the cinchonas, which has been so much discussed, and is still so obscure, particularly fixed the attention of M. Weddell. It was with reference to this object that his course was principally directed, and the results of his laborious researches form the subject of the work alluded to in the heading of this paper. This important work, which, when finished, will form a magnificent folio volume with numerous engravings, appeared to us so important in a pharmaceutical point of view, that we did not wait its completion before giving some account of it. M. Weddell with much kindness having placed at our disposal the first sheets of his work, we have extracted some details, which will indicate the general character of the work, and will excite much interest in the talented young man whose zeal, intelligence, and courage have accomplished so much.

Since the time of Condamine, who was the first to describe the cinchonas in Europe, until the illustrious travellers Humboldt and Bonpland, to whom we are indebted for the earliest accounts of the geography of this class of plants, a number of learned men of all countries have made this the object of their researches ; and a catalogue alone of the works published on this subject would occupy many pages. But only a small number of those who have described the cinchonas have studied them in their native country, and it is the observations of these few which have furnished matter for the greater part of the other writers.

The origin of the bark of the cinchona was for a long time a mystery. It was Condamine who first threw any light on the subject, and to this further additions were but slowly made. Joseph de Jussieu in 1735 accompanied as botanist the Commission of the Academy of Sciences sent to measure a degree of the meridian under the equator. He visited, about the same time as the celebrated astronomer, the cinchona forests of Loxa, those of high Peru, and almost penetrated into the frontier of Brazil. A succession of unfortunate accidents prevented the publication of the results of his researches. He did not return to Europe until 1771, after an absence of thirty-six years, and was then deprived of his reason.

Thirty years later, two expeditions were engaged to explore the cinchona regions in lower Peru and New Granada, the one directed by the celebrated Mutis, the other by Ruiz and Pavon. The immense investigations of these naturalists did not advance the history of these plants as much as might have been expected. Since the observations of Messrs. Humboldt and Bonpland, who visited the same country subsequently, the region from which the cinchonas are exported has been greatly increased, in consequence of the discovery of new districts, and commerce has been enriched by several new species.

Previously to the year 1775 Loxa bark was the only kind of cinchona known in commerce. It was not until 1772 that Mutis discovered the valuable tree in the neighbourhood of Santa Fé de Bogota, and at this period Europe began to receive cinchonas direct from the ports of New Granada on the Atlantic. Some years later, the authors of *Flora Peruviana* studied the species of lower Peru, to the north of Lima, and these also were introduced into commerce. The only species, then, which, botanically speaking, still remained unknown in Europe, were those growing in the vast extent of country extending southward. Notwithstanding the efforts of Joseph de Jussieu and the botanist Taddaeus Haenke, little was added to the scientific knowledge of the cinchonas by their travels. The object of M. Weddell's work is to make known the species which have come under his observation in these regions during the years 1845, 46, 47. The immense commercial demands on the cin-

chonas of these parts, tending to exhaust the forests, rendered it necessary that new sources should be discovered. At a period when the consumption of these barks was becoming more and more considerable, it was desirable that attention should be directed to those cinchonas which will have to replace the Calisaya bark, the supplies of which are becoming less abundant. These species, although they may be less rich in active principles, yet, from their abundance, offer some security against the prospect of our being deprived of one of the most valuable medicines of the vegetable kingdom.

M. Weddell penetrated into Bolivia in the month of August, 1845, through the country of the Chiquito Indians. The formation of the country in this province is quite incompatible with the existence of the true cinchonas. The greater part of its surface is so low and flat, that during the rainy season it is completely inundated. In the month of November he journeyed towards the south, gained the Rio Grande, and crossed the country of the Cordillera, as far as Tarija, where he arrived in January, 1846,—a laborious journey, the object of which was to determine with correctness the southern limit of the district of the cinchonas. M. Weddell gave the name of *Cinchona Australis* to a species which he discovered, like a distant sentry, at this extreme point, near to the nineteenth parallel of south latitude. In the month of August following he visited some of the large towns of Bolivia. At Cochamba a curious phase of his expedition began. He traversed near there the great chain of the Andes, purposing to reach La Paz, where the cinchona commerce is carried on to the greatest extent. The Andes present, at this part, a long and fine series of natural steps, by which the traveller gradually descends, passing successively in review all the varieties of climate, and all the corresponding shades of vegetation. The different species of cinchona are rapidly presented to observation. Almost immediately on his entering the province of Enquisivare he had the opportunity of studying the trees which produce the Calisaya bark, the most valuable of all the species in consequence of the large proportion of quinine which it contains. He gave to this tree, previously unknown, the name of *Cinchona Calisaya*. At Palca he learned that there was recently discovered, on the borders of the Rio Ayopaya, an immense forest of cinchonas which no one had yet explored. But it was in the province of Yungas, the richest and most fertile of the provinces of Bolivia, that he obtained the most precise information of the mode of procuring, preparing, selling, and adulterating the barks which he wished to study.

In 1847, after the rainy season, M. Weddell resumed the road of the great Cordillera. The town of Sorata, or Esquibel, situated on the eastern side of the Andes, and at the foot of one of its highest peaks, is considered one of the most prolific sources of the Bolivian cinchonas; but is, in fact, only a simple point of transit for the products of the valleys of the interior. It was towards these that he directed his course, passing through the snows of Illampo. The Rio Tipoani, the Pactola of Bolivia, takes its origin here. One of the most dangerous roads conceivable is that along the ravine bearing the above name, and leading to the village of Tipoani, a pestilential place, which nothing but the love of gain could render habitable. The cinchonas met with in all parts of this region are as much sought after as gold itself, but the larger trees are already beginning to disappear. In order to study the yet undetermined points, M. Weddell embarked on a raft constructed for the purpose, on which he descended in safety the rapids of Rio Tipoani. He then visited the mountains of Rio Tumache. This expedition being terminated, he reascended the Rio Mapiri on his raft, and then took the route across the forests leading to Aten and Apolobamba, where he arrived exhausted with fatigue and overcome with the fever which he had caught in the regions of Tipoani. The country here

assumes a more agreeable aspect. The forests have disappeared, or occupy only the horizon ; the eye rests on pretty grassy slopes, interspersed with scattered shrubs, and frequently with charming groves. Here several species of cinchonas are met with, which scarcely exceed the shrubs in height, and of which the flowers embalm the air with their delicious perfume. The town of Apolobamba is the centre of one of the districts of Bolivia which was first explored. For a long time its forests have been stripped of cinchonas.

At the end of July, 1847, M. Weddell visited the province of Coraboya, one of the most interesting in Peru. It is divided by the Cordillera into two regions, one of which comprehends a long series of valleys, which furnish the greater part of the cinchonas now exported from the Peruvian Republic. It would be difficult to give an idea of all the vegetable treasures buried in these solitudes. The thirst for gold originally peopled this district, but the forests have regained their empire, and the hatchet of the *cascarillero* now alone breaks the silence.

We will here quote the words of the talented author : The name of *cascarilleros*, says M. Weddell, is given to the men who cut the cinchonas in the woods ; an appellation equally applying to those who are specially engaged in this commerce. The former, and of these alone I will speak here, are in general men who have been brought up to this laborious occupation from their infancy, and are accustomed by a kind of instinct to guide themselves in the midst of the forest. Without any compass but that intelligence peculiar to man in a state of nature, they guide themselves as unerringly in these labyrinths as if they were surrounded by an open horizon. But how often does it happen that those less experienced in this art lose themelves and are never more heard of !

The only period which is not suited for the collection of cinchona bark is the rainy season, which in duration corresponds in some respects with our winter. If some persons contend that the period of the ascension of the sap is the best for stripping the trees, their precepts are certainly not practically adopted, for even during the rainy season the collection of the bark is only suspended on account of physical obstacles to its continuance.

The cutters are not generally engaged on their own account, but are mostly in the service of some merchant or small company. A confidential person is sent with them into the forests, who is called the *major domo*. It is his duty to receive and examine the barks which are brought to him by the different parties in the forest, and to superintend the distribution of the provisions.

The first thing done by those who engage in this kind of speculation in a region previously unexplored is to have it examined by experienced *cascarilleros*, who are called *diestros* or *practicos*. The duty of these is to penetrate the forests in different directions, and to ascertain to what points they may be profitably explored. They are expected to state whether there are any cinchonas, and in what quantity ; also to point out the direction in which the trees are to be found, and to report on the quality of specimens of the bark obtained.

This preliminary investigation is very important, and requires the possession of much sagacity, patience, and experience in those who are engaged in it. It is upon their report that the chances of success are calculated. If it be favourable, a road is immediately commenced up to the point which is to form the centre of the operations ; and from this time all those parts of the forest adjacent to the road become provisionally the property of those who have formed it, and no other *cascarilleros* can work there.

On the arrival of the *major domo* with his cutters in the neighbourhood of the part to be explored, he chooses a favourable site for his encampment, as near as possible to a spring or river. He constructs a hut or slight house to shelter the provisions and the produce of the cuttings ; and

if he anticipates having to remain for some time in the same locality, he commences the cultivation of maize and a few vegetables. Experience, indeed, has shown that an abundant supply of provisions is one of the most important conditions of success in this class of undertaking. The *cascarilleros*, during this time, are distributed through the forest, one by one, or in small parties, each carrying under a small cloak, and suspended at his back, provisions for several days, and the coverings which constitute his bed. In this way these poor beings have occasion to put in practice all their courage and patience in order that their work may prove fruitful. Obliged to have the hatchet or knife continually in his hand, to disembarrass himself of the numerous obstacles which arrest his progress, the *cascarillero* is exposed, from the nature of the circumstances by which he is surrounded, to an infinity of accidents which too often endanger his life.

The cinchonas rarely constitute an entire forest, but form groups more or less compact, distributed in different parts of it. The Peruvians give these the name of *manchas*. In some cases, and most frequently, they grow separately. However this may be, it is in discovering them that the skill of the *cascarillero* is principally exerted. If the position be favourable, the tops of the trees first attract his notice ; a slight movement peculiar to the leaves of certain species, a particular colour of the foliage, the aspect produced by a great mass of inflorescence, enable him to distinguish the cinchonas from a great distance. Under other circumstances he confines his inspection to the trunks, of which the external layer of the bark, or *enves* as it is called, presents remarkable characters. Very frequently the dry leaves which he finds on the ground are sufficient to indicate to him the vicinity of the object of his search; and if these indications have been brought there by the wind, he knows in what direction to look. An Indian, under these circumstances, is an interesting object for observation. Passing in and out through the narrow pathways of the forest, glancing through the foliage, and appearing to sniff the earth, he seems to walk like an animal pursuing its prey, and darts forth when he thinks he has discovered the object of his search, nor stops until he has arrived at the foot of the trunk which he had descried from the distance. It is not always, however, that the exertions of the *cascarillero* are productive of such favourable results. Too often he returns to the camp empty handed, and without provisions ; and not unfrequently, when he has discovered on the side of a mountain indications of the tree, he finds himself separated from it by a torrent or ravine. Entire days may then pass before he can attain the object which, during this period, he allows not to escape from his sight.

In order to strip the tree of its bark it is felled with a hatchet, being cut a little above the root, and the bark previously removed from this part, so that nothing may be lost ; and as at the base the bark is thickest, and therefore most profitable, it is customary to remove the earth from around the trunk, so that the barking may be more complete. The tree seldom falls immediately when cut through, being sustained either by climbing plants or by the adjacent trees ; these are fresh obstacles to be overcome by the *cascarillero*. I remember having once cut the trunk of a large cinchona in the hope of bringing its flowers within reach, and, after having felled three adjacent trees, had the mortification to find it yet standing, being held up by the interlacing creepers.

When at length the tree is down, and the useless branches have been cut off, the peridermis is removed by striking it, either with a little wooden mallet, or even with the back of the hatchet ; and the inner bark, being thus exposed, is often further cleaned by means of a brush. The bark is then divided by uniform incisions circumscribing the pieces which are to be removed, and these are separated from the trunk with a common knife or some other instrument, the point of which is carried as close as possible

to the surface of the wood on introducing it into the incisions previously made; and if the position of the trunk prevents the operator from removing the whole of the bark by the first operation, it is subsequently divided so as to admit of its being turned. The dimensions and regularity of the pieces necessarily depend more or less on circumstances; in general, however, for the convenience of transport and facility of preparation, they endeavour to make them from fifteen to eighteen inches long, and four or five inches wide. The bark of the branches is separated in the same way as that of the trunk, excepting that it is not deprived of its exterior coating or peridermis.*

* Formerly, with very few exceptions, the bark deprived of its peridermis was not received in commerce; not that any virtue was supposed to exist in that part, but it furnished distinctive characters, by which it was easily known, and rendered difficult of substitution. The necessity which was thus imposed upon the *cascarilleros* of preserving this, in many cases, frail part, demanded on their part the greatest care. Thus in many places it was the custom to fell the tree two or three days before barking it, so that, desiccation having commenced, the different layers of bark might adhere together.

I think that the removal of the peridermis from the surface of the thick barks at the time of cutting, is not quite general. Some of the cinchonas of New Granada, which I have recently seen, retained the outer coating. However this may be, we perceive the necessity of studying the bark under both aspects. I am persuaded that many museum specimens, collected at a period when it was customary to preserve the peridermis, would no longer be thought of doubtful utility, if considered in this point of view.

The process formerly employed for separating the young barks from the wood, also differs much from that which is now practised; hence there is a certain difference in the formation of the cylinders prepared by the two methods. I have already described the way in which it is now done, and it is easy to understand that by this method the dimensions of the separated pieces may depend on the patience or skill of the *cascarillero*, or on the circumference of the branch or trunk from which they are taken. Formerly, on the other hand, each piece was cut by one operation, the *cascarillero* holding his knife by the two extremities, and drawing it rapidly towards him. The flat pieces obtained in this way necessarily varied in width, according to the size of the trunk from which they were taken, and the quills when dried were frequently no larger than a pen. The pieces also had sharp edges, and they were thicker at the centre. The defect of this method was the immense loss which resulted, for nearly as much bark was left on as that which they removed, the former being considered useless on account of its being deprived of the peridermis. But this loss was as nothing when compared with that which I have next to notice. I allude to the almost entire rejection, for some time, of the bark of thick trunks. The loss resulting from this cause was immense. Many of those experienced in this subject having affirmed that with age the juices disappear by degrees from the bark, and that those barks only are efficacious which are taken from branches of moderate size, four times as many trees were sacrificed as would have been the case under other circumstances. It has been said, it is true, that the *cascarilleros* climbed the trees to cut off the branches, taking care to leave the terminal branch; but those whom I have known have always candidly confessed that they found the most simple method to be that of cutting the trees down, and this, I believe, has been the uniform practice. Thousands of quintals of cinchona bark have been thus left to perish in the forests; and it has only been since the inutility of the practice has been proved by chemical analysis that it has

The details in the process of drying also vary slightly in the two cases; the thinnest pieces of bark from the branches or small trunks, intended to make the quilled cinchona, are simply exposed to the sun's rays, and of themselves take the desired form, which is that of a hollow cylinder; but the bark taken from large trunks, which is to constitute the flat cinchona, or, as it is called, *tabla* or *plancha*, must necessarily undergo a certain degree of pressure during the process of desiccation, without which it would become mis-shapen, or take a cylindrical form as in the preceding case. To effect this, after first exposing the pieces of bark to the sun, they are placed one on the other in crossed squares, in a similar manner to that practised in timber-yards in the arrangement of the planks of wood, and on the top of this pile a heavy weight is placed. This process is repeated for several days until the bark is completely dried.

The above process is that most commonly adopted in preparing the cinchonas; but it will be easily comprehended that this must vary, in some degree, according to the locality, or the nature of the tree operated upon. In many places the bark is not pressed at all, or but imperfectly so, and it is then generally out of form or slightly curled. The peridermis is often but partially removed, or simply scraped. Finally, whether it be accidental, or whether it be done with the view of augmenting the weight, there frequently remains a certain quantity of moisture in the bark, which greatly deteriorates it. It thus appears that cinchonas which would have presented the same characters if similarly prepared, may, according to the circumstances, vary very greatly. In any of these cases the labour of the *cascarillero* is by no means ended, even when he has finished the preparation of the bark; he has yet to carry his spoil to the camp, and, with a heavy load on his shoulders, to retrace his steps along those parts which, while unburdened, he traversed with difficulty. The labour involved in this part of the operations can hardly be conceived. I have seen more than one district where the bark has to be thus carried for fifteen or twenty days' journey to get it out of the wood from which it was obtained; and considering the amount of remuneration received, I could hardly imagine men so unfortunate as to engage in work so laborious and ill-paid.*

Something yet remains to be said with reference to the packing of the bark. It is the *major-domo* who performs this duty. As the cutters bring him the bark, the produce of their labour, he submits it to a slight examination, and rejects that which is bad. It is then, if necessary, exposed to a fresh process of desiccation, and formed into bundles of nearly equal weight, which are sewn up in coarse canvas kept for that purpose. In this condition the bundles are conveyed on the backs of men, donkeys, or mules, to the depôts in the towns, where they generally receive an exterior envelope, consisting of a fresh hide, which as it dries makes a hard and compact package. In this form the packages are known by the name of *serons*, and it is thus that they arrive in Europe. The usual weight of a

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been discontinued. It is not to be considered, however, that the bark of old trees contains as much of the active principle as those which have only arrived at maturity. There are limits between which all are good: indeed, none ought to be rejected.

* In general, before the product reaches the coast it passes through at least three or four hands, and on each occasion its price is augmented; moreover, as carriage is very expensive, it follows that the price charged in Europe will afford no idea of its cost on the borders of the forest. At Pelechuco, for instance, 1 kilogramme (2 lbs. 3 ozs. avoirdupoise) is only worth a franc and a half (fifteen pence), and for this twenty francs are now paid in Paris

seron is from 70 to 80 kilogrammes (kilogramme 2 lbs. 3 ozs. avoirdupoise); but the weight is sometimes much less than this. From these details it will be seen how erroneous the notions of some persons still are with reference to the collection of cinchona bark; many having thought that it continues under special surveillance as it was formerly represented to be; and others that the cinchona-trees are cultivated in enclosed parks and treated as the cork-trees of our country. It must be acknowledged that the mode of collecting this valuable product appears to be always under the control of the half-savages by whom it is performed; and if some efficient means be not discovered of counteracting the ruinous and wasteful method adopted, our descendants will inevitably have to regret the entire or at least partial extinction of the different varieties of cinchona.

The opinion of those who calculate upon the forests being restocked from seeds, and from suckers thrown out from the stumps of the fallen trees, is more nearly in accordance with truth; but, as will be seen, even this source of renewed supply can only be depended upon to a certain extent. Too often the suckers, recklessly cut down, perish with the trunks to which they were attached; and the young trees, which very slowly attain to a certain degree of development, fall in their turn beneath the hatchet, never again to appear. The same may also be said of the seeds. A supervision and control exercised over the cutters, by means of inspectors, would, to a certain extent, check this vandalism, but, unfortunately, could not practically be carried into operation. The inspection of the woods in our country is a very different thing from inspecting a forest in the New World, especially if this forest cover 20,000 square miles.

In fact, it appears to me that there are but two methods which could be adopted for preventing the rapid destruction of the cinchona-trees. One is to limit the exportation to a quantity proportionate to the sustainable produce of the forest; the other, that of making the trees objects of regular cultivation. To limit the exportation would certainly be the most efficacious method; but is it not to be feared that the disproportion between the consumption and production is already too great to admit of the balance being thus restored? and moreover, are not our wants too pressing to give way to considerations affecting only the future?* There remains then cultivation, and this must be resorted to. If there be a tree which is worthy of being acclimated in a French colony, it is, certainly, the cinchona, and posterity will be grateful to those who may succeed in putting this plan into execution.

In a subsequent article we propose noticing the particular notions of M. Weddell on the classification of the cinchonas; to which will be added the description of several new species for which science is indebted to the learned researches of this naturalist.—*Journal de Pharmacie et de Chemie.*

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* In support of this view of the subject we may cite the case of the Company of La Paz, to whom the Bolivian government conceded the monopoly of the commerce of the cinchonas of Bolivia, with the power of annually exporting 4,000 quintals, or 40,000 Spanish pounds. The restriction imposed in this case was never observed, and complaints have been made that the quantity allowed to be exported has been greatly exceeded. What would it be, then, if the restrictions were entirely removed, as they are in most other parts, and especially in Peru, where the exportation, during some years, has attained to an extent which is almost incredible?

In New Granada, at the time when the commerce of cinchona bark was carried to the greatest extent, that is to say at the commencement of this century, the quantity exported from Carthagena alone amounted in one year, 1806, to the enormous extent of 1,200,000 pounds. In the present day, on the contrary, scarcely any is exported.

ON CINCHONA CALISAYA.

BY M. WEDDELL.

In the *Annales des Sciences Naturelles*, t. x., Juillet 1848, M. Weddell takes a review of the genera *Cinchona* and *Remijia*, D.C., and of Endlicher's sub-genus *Cascarilla*. He mentions the specific characters and localities of several new species which he has discovered in South America. Of these the most important is the *Cinchona Calisaya*, the plant which yields the yellow or Calisaya bark ; and we therefore subjoin his account of it :—

C. Calisaya. C. foliis oblongo vel lanceolato-obovatis, obtusis, glabratis, nitidis, subtus in axillis venarum scrobiculatis; filamentis dimidio antherarum brevioribus; stigmatibus subexsertis ; capsula ovata, flores vix æquante, dupla sua latitudine fere breviore; seminum ala elliptica, magine ciliato-denticulata, denticulis approximatis obtusiusculis.—*Hab.* in Bolivia.

ON ATROPINE.

BY DRS. BOUCHARDAT AND STUART COOPER.

The authors recommended the substitution of atropine for belladonna, in order to obviate the uncertainty of the operation of the latter. The dose can be increased from two milligrammes to one centigramme [about $\frac{3}{100}$ths to $\frac{6}{10}$ths of a grain troy.]

The local pain caused by atropine when endermically applied is only of short duration, and is not accompanied by any bad consequences. Internally, atropine may be given in the following forms :—

1. *Tinctura atropini.*—1 gramme of atropine dissolved in 100 grammes of spirit of wine of 85 per cent.; one drop of this solution contains about half a milligramme of atropine. The dose is ten drops.

2. *Syrupus atropini.*—One decigramme of atropine dissolved in ten grammes of water, acidulated with one drop of muriatic acid, and mixed with 100 grammes of simple syrup. In 100 grammes of this syrup is contained one centigramme of atropine. The dose is twenty grammes.

3. *Pulvis atropini.*—One centigramme of atropine mixed with two grammes of sugar, and divided into twenty equal parts. Each powder contains half a milligramme of atropine. Children of five years old may take in hooping-cough two or three such powders daily.

4. *Pilulæ atropini.*—Five centigrammes of atropine, mixed with pulv. rad. althææ and a small quantity of honey, may be made into fifty pills, and one or two given for a dose.

5. *Collyrium atropini.*—One decigramme of atropine dissolved in 100 grammes of distilled water. *Collyrium atropini fortius* is prepared with five centigrammes of atropine and twenty grammes of distilled water. For dilating the pupil, one or two drops are to be introduced into the eye.

Bouchardat recommends the following method of preparing atropine. The atropine is to be precipitated by a watery solution of iodine in iodide of potassium, and the iodureted hydriodate of atropine decomposed by zinc and water. The metallic oxide is separated by means of carbonate of potash, and the alkaloid dissolved in alcohol.

Rabbits are scarcely affected by atropine. Dogs are soon poisoned by it. On man the effect is much stronger. One centigramme is able to produce the following symptoms : At first, acceleration of the pulse by eight to twenty strokes; after thirty to fifty minutes, an affection of the brain is produced. The first and most constant symptom is dry throat, with difficulty of swallowing. The second is dilatation of pupils, with increased power of vision, also giddiness, noise in the ears, hallucination, delirium, stranguary, with incapacity of emitting the urine ; a sensation of formication in the arms, rigidity of the thighs, depression of the pulse. The unfavourable symptoms disappear after twelve to twenty hours. The sanatory effect of the atropine has chiefly been substantiated in chorea and other chronic nervous diseases.

ON OIL OF COPAIVA.

BY C. G. MITSCHERLICH.

Mitscherlich has made a number of experiments with the oil of copaiva, and found that the effects of it are similar to, but much milder than, those of the oils of lemon and turpentine. Oil of copaiva is, of all the volatile oils yet examined, the feeblest poison, for though from six drachms to one ounce of it introduced into the stomach of rabbits caused in full-grown rabbits considerable illness, it did not produce death. Young animals died within from 11 to 28 hours from one ounce.

The oil of copaiva is absorbed from the stomach. Immediately after death has taken place, it can be detected by the odour in the abdomen, but not in the blood. The urine acquires a strong odour of the oil. The experiments on the odour of the breath cannot be relied on, as, by the introduction of the oil through the mouth, the latter is easily soiled by it, and then acquires the smell of the oil.

The volatile oil of copaiva, moreover, causes a similar change in the organism to that produced by the oils of lemon, turpentine, and juniper. The stomach is neither inflamed nor reddened ; in one case small blood discs were perceived in it, in another instance the innermost layer of the glandular coat was softened. The small intestine is so far changed, that its epithelium was removed and converted into mucus. The large intestine was, in one instance, where the oil did not reach it, perfectly normal. In another case, where the oil had reached it, no epithelium was perceived, and one spot was inflamed.

The chief symptoms in cases of poisoning with oil of copaiva are, frequent but not very powerful pulsation of the heart ; greatly accelerated respiration ; frequent emission of urine, mostly in small quantities ; frequent excretions of fæces, which are at first shaped, but afterwards pasty, and at last mucous and mixed with blood. Muscular weakness increases ; in most cases a diminished sensibility, slow respiration, frequent and very feeble pulsation of the heart, lying on the side, and death without convulsions. It appears that death was produced by the passage of the oil into the blood, and not from the bowels.

Upon the skin of man the effect of the oil of copaiva is much weaker than that of the oils of lemon and turpentine, and weaker than that of the oil of juniper. In one case, where a spot on the back of the hand was moistened for an hour with the oil, no burning was experienced ; in another case a very slight burning was felt only at last.

The oils of lemon, turpentine, juniper, and copaiva, agree in their percentage composition ; the equivalents of carbon and hydrogen being in each as five to four. They greatly resemble one another in their pharmacological effects, but differ materially from the other volatile oils, which have a different composition.

The volatile oils of mustard, caraway, fennel, cinnamon, nutmeg, and bitter almonds, in large doses, excite the vascular system and the respiratory organs. They produce diarrhœa, increase more or less the secretion of urine, and cause death with very similar symptoms.

The volatile oil of savine differs from the foregoing in being a much stronger poison, causing no diarrhœa, and acting more violently on the kidneys.

NEW METHOD OF ANALYSING METALLIC SALTS.

BY M. ROUCHET.

Being engaged in investigating the composition of the different nitrates of copper, a mode of analysis suggested itself to me, which, from its simplicity, its accuracy, the rapidity with which it is performed, and the

general application of which it is susceptible, appeared to be worthy of being brought under the notice of Chemists.

This method consists in precipitating the insoluble metallic base with a measured quantity of an alkaline solution, the neutralising power of which has been previously determined by means of a test-acid, such as is used for alkalimetrical purposes. After precipitating the oxide, the liquor is poured on to a filter, and the precipitate washed until the water ceases to affect litmus paper. The free alkali contained in the filtrate is now estimated with a test-acid, and the difference between the quantity thus found and that used in effecting the precipitation will be the quantity of alkali equivalent to the acid contained in the salt, which is easily determined by a simple calculation.—*Comptes Rendus.*

ON A SIMPLE AND CERTAIN TEST OF THE QUALITY OF INDIGO.

BY H. REINSCH.

Reinsch tried various modes of determining the goodness of indigo—such as the external appearance ; the intensity of colour imparted to yarn by the cold vat (made of indigo, lime, sulphate of iron and water) ; the quantity of indigo-blue obtained by sublimation ; the quantity of indigo-blue deposited from the cold vat ; and the specific weight. Not one of these methods, however, gave results to be relied on.

"At last," he says, "I resorted to fuming sulphuric acid, and obtained the most satisfactory results. It is necessary, however, that the indigo should be pounded very fine, and the acid should be as concentrated as possible. I must also observe, that the solution of the Java indigo, and of that indigo which I prepared in a chemical way, by treating it with acid, caustic potash, spirit of wine and water, did not possess that pure blue colour like that of the Bengal sort, although I repeated the experiments several times, and could not, therefore, determine anything with regard to the purified indigo. A dyer of great experience informed me, that for solution in sulphuric acid he prefers Bengal to the Java sort, as the latter is burnt by the acid, which is always the case when the indigo does not dissolve with a pure blue colour, but assumes a crimson hue on the sulphuric solution being poured in water.

"The mode in which I proceed is as follows:—$\frac{1}{10}$th gramme of each sample of indigo is well pounded, mixed with four or five drops of fuming sulphuric acid, and rubbed with it until the whole forms a brown uniform mass. To this one gramme of sulphuric acid is added and triturated till it produces a clear green solution, whereupon another gramme of fuming sulphuric acid is added ; lastly, this solution is gradually mixed with ten grammes of water. Two glass cylinders of equal length and width are now divided each into twenty equal parts, and one gramme of the sulphuric solution (which is best measured by a glass tube closed at one end) poured into one and mixed with water, till the solution is of light blue colour and transparent; if one gramme of the solution does not produce sufficient coloration, a small quantity more of it is added, till the cylinder is filled with the light blue solution. I generally commence with the apparently best indigo. After this the second cylinder is filled in the same way with an equal quantity of sulphuric solution of the same indigo sample and water, in order to see whether the two solutions are equal in colour. If this be the case one of the cylinders is emptied, and an equal quantity of sulphuric solution of an inferior sample poured into it and gradually diluted with water, till the solutions in both cylinders are perfectly alike in colour. Care is to be taken that the coloration be not too intense nor too light, it being in either case difficult to obtain both

solutions of the same hue. For discovering this equality the eye will also be much assisted if the relative position of the cylinders is changed from the right to the left, or by placing them alternately before or behind one another. As soon as the colour of both is thus found to be equal, the quantity of water is examined which has been poured into the second cylinder. Supposing now that one gramme of sulphuric solution has been employed in either of the cylinders, but the quantity of water which produced the equal colour was in the first or standard cylinder twenty parts, and in the second only fifteen parts, then the sample of which the latter solution was made will contain $\frac{5}{20}$ths or one quarter less of colouring matter. In order to guard myself against all deception, I had several such samples prepared by one of my pupils, and upon subjecting them to this test I always discovered the correct quantity.

"This method is so easy and convenient that everybody can avail himself of it. All that is required is to keep ready a certain quantity of indigo-solution of a known quality as standard solution, and then to prepare a sulphuric solution of the indigo to be tested. I have before observed that the purified indigo did not give the desired results, and I used, therefore, Bengal, first quality, which excelled all others in colouring capacity, and contained at least fifty per cent. pure colouring matter.

"The results were : Bengal as standard = 20.

	First Exp.	Second Exp.
Bengal, first quality, from another source	20	20½
Bengal, II.	19	19
Bengal III.	7	8
Java I.	19	19½
Java I. from another source	19	18½
Java, middling fine	18	18

"The third quality of Bengal presented a very dirty blue solution, yet it has been declared by a dyer of great practice as perfectly adapted for the warm colour; but as the blue from the warm vat is rather a dirty brownish-blue, it is certainly possible that the dyer can make use of it for the warm colour; it is, however, quite unfit for the cold vat, and for Saxon blue (sulphuric solution of indigo). For medical purposes it ought never to be used, for it is probably nothing but the lowest sediment of the indigo.

"The above-described method may even be made more accurate if longer glass cylinders are used, so that the per-centage quantities may be indicated. The glasses must then be divided in 100 parts. The larger the degrees are, the more accurate will the results be.

"I have yet to add some observations with regard to an adulteration practised on the indigo, and which is of importance to the druggist. Each large indigo chest contains a quantity of dust, which is said to amount sometimes to eight or ten pounds. This dust is an artificial product, composed of starch or white lead and powdered indigo, and is put in the chest in order to increase its weight.

"If we now consider the present price of indigo, we find the finest Bengal to cost four florins thirty kreutzers per lb., the finest Java indigo being the same price ; still Bengal is always to be preferred. The middle sort of Bengal costs three florins; the low, No. III., two florins twenty kreutzers ; but what a difference in their colouring properties ! Bengal No. II. is nearly, if not equally, as good as No. I., and its price is only two-thirds of that of the latter. Bengal III., on the contrary, is sold at eight one-ninth of the price of No. I., and is worth, as dying material, but one-third. These points are certainly deserving the consideration of the dyer in pecuniary respects, and they will be of equal importance for the physician, if the medicinal principle in indigo should be discovered as distinctly as was that in the sponge and goitre-stone [kropfstein, *Cellapora Spongites*] by the discovery of iodine."—*Jahrbuch für praktische Pharmacie.*

PROCESS FOR ESTIMATING THE QUALITY OF OPIUM.

BY M. A. GUILLIERMOND.

The following process is recommended in preference to that usually adopted, which is tedious and complicated.

Fifteen grammes (231 grains) of the opium are taken for examination, being cut from different parts of the lump. It is rubbed in a mortar with 60 grammes (926 grains) of rectified spirit, and strained through linen; the marck is pressed, and treated again with 40 grammes (617 grains) more of spirit; the solutions are mixed together in a wide-mouthed bottle, into which 4 grammes (61 grains) of ammonia has been previously introduced. After twelve hours the morphia will be found separated, together with a certain quantity of narcotine, the morphia adhering in the form of coloured crystals to the inner surface of the vessel, and the narcotine being in small pearly acicular crystals, white and very light. These crystals are washed on a filter with water, in order to purify them from the meconate of ammonia which they contain. The narcotine may then be separated from the morphia by decantation, as the former alone, from its lightness, is held in suspension in the water.

M. Mialhe has modified this method of separating the narcotine and morphia. He washes the crystals, previously powdered, five or six times with a small quantity of ether, after which the morphia, which remains undissolved, is dried and weighed.—*Journal de Chimie Médicale.*

ON THE ACTION OF LIGHT ON PRUSSIAN BLUE EXPOSED IN A VACUUM.

BY M. CHEVREUL.

In an investigation of the influence of light on different colouring matters, when exposed in the vapour of water, in oxygen, hydrogen, atmospheric air both dry and humid, and in a vacuum, M. Chevreul observed that some of the colouring matters which, under ordinary circumstances, are the most unstable, such as carthamus and archil, retain their colours unaltered for years when exposed to the light in a vacuum; while, on the contrary, Prussian blue when exposed in a vacuum loses its colour and disengages cyanogen or hydrocyanic acid. He has further observed that Prussian blue which has been thus decolorized is again immediately restored to its original blue colour on exposing it in an atmosphere of dry oxygen gas.

CONGELATION OF ALCOHOL.

It has been a disputed point as to whether alcohol could be congealed by the application of any degree of cold hitherto produced. M. Despretz, in investigating some of the properties of liquefied nitrous oxide, has succeeded in effecting the partial solidification of absolute alcohol, by surrounding it with a mixture of solid carbonic acid, ether, and the liquefied nitrous oxide, under an exhausted receiver.

ON THE PREPARATION OF SPECULA FOR TELESCOPES.

It is well known that the alloy (usually called *speculum-metal*) used in the preparation of specula for reflecting telescopes is very intractable: for, while it is as hard as steel, it is so brittle that a slight blow will shiver it to atoms; and it is so sensitive to changes of temperature, that the affusion of a little warm water over its surface, not too warm to be disagreeable to the touch, will crack it in every direction. Astronomers, therefore,

have paid great attention to its preparation and casting, with the view of overcoming the difficulties of preparing specula of large size.

According to Lord Rosse* the best materials for constructing the reflecting surface are "tin and copper. The materials employed by Newton in the first reflecting telescope are preferable to any other with which I am acquainted; the best proportions being four atoms of copper to one of tin (Turner's numbers)—in fact, 126.4 parts of copper to 58.9 of tin." But this alloy, as usually cast, is visibly porous when carefully tested with a microscope. Both Mr. Potter and Lord Rosse have proposed plans for obviating this defect—the former in 1831, the latter in 1840. Mr. Potter declares that Lord Rosse's plan is in principle the same as his own; and, in a letter in the *Athenæum* of September 29th last, thus states his case:—

"I perceive, in the report from your own correspondent of the proceedings of the British Association, the following.

"'Dr. Robinson gave a rapid sketch of the steps by which Lord Rosse was led to the construction of his instruments. * * * When describing the mould used, with its metallic bottom of packed hooped iron, he stated, that the plan proposed by Mr. Potter, and now claimed in no measured terms as originating the entire improvements, had been tried and found utterly unfit for producing the proper surface.'

"Now, my plan was that of *chilling* the casting of the metal [See *Brewster's Edinburgh Journal of Science*, vol. ii. for 1831, page 18] in contradistinction to the unsuccessful old method of annealing, prescribed or received by all previous writers on the subject,—including Lord Oxmantown, in vol. ii. of the same work.

"I proved the principle of *chilling* by casting several small specula in sand, as usual, but on solid bases of steel and cast-iron, with uniform success, before recommending it to Lord Oxmantown's notice by name, in the same paper.

"His Lordship published a paper in the *Philosophical Transactions* for 1840, entitled 'An Account of Experiments on the Reflecting Telescope;' in which, without alluding to my previous discoveries on the same subject, he has the following:—'Were it possible, therefore, to satisfy the following conditions, *viz.*, that heat should be abstracted rapidly and equally from the lower surface of a fluid disc of speculum metal, so that it should solidify from the bottom upwards in strata, or rather infinitely thin laminæ, the surface being the last to solidify, we should have a perfect casting * * * * * This, I believe, is the true principle upon which the most perfect castings can be obtained: its truth has been fully proved by practice.' After describing a method of melting the speculum-metal in a cast-iron mould, 'and then exposing its lower surface to the action of a jet of cold water,' he says, 'The experiment, therefore, is not worth repeating, particularly as the other plan is simple and succeeds perfectly. It is obviously to make the lower surface of the mould of iron, and the upper sides of sand. At first a simple disc of iron was tried; but although the castings were sound, there was this defect, that bubbles of air were often entangled between the iron and speculum-metal, producing cavities which it was tedious to grind out. The disc was therefore replaced by one made of pieces of hoop-iron, placed side by side, with their edges up, tightly packed in an iron frame: the edges were brought to a smooth surface of the proper curve, either by the file or lathe, whichever was most convenient. A metallic surface was thus constructed everywhere porous; as, however close the hoop-iron had been packed, the interstices suffered air to pass freely through. So successful was this expedient, that, of sixteen plates cast for the three-feet speculum, not one was defective.'

"We see that the reason for making a base of hoop-iron was, that in

* *Philosophical Transactions* for 1840, pp. 504, 5.

his Lordship's practice there were often cavities found on the surface of the casting which gave trouble to grind out. But Mr. Lassel uses a solid base for his large specula, and does not find the inconvenience [See *Phil. Mag.* for February 1849]. A Cambridge friend of mine, now tutor of his college, a very successful amateur reflecting-telescope maker, thought well of the reasoning leading to the said variation of the chilling method, and tried a base of hoop-iron ; but he found the face of his metals in no way superior to those cast on a solid chilling body, and concluded that the cavities found by his Lordship arose from some other cause.

"I maintain, therefore, that the hoop-iron variation of method is in *nowise essential* to my chilling process, and more than doubtful as an improvement."

POLISHING POWDER FOR THE SPECULA OF TELESCOPES.

Both Mr. Potter and Lord Rosse have published directions for the best method of preparing a polishing powder for the specula of telescopes. The two processes are essentially the same, and, therefore, Mr. Potter deserves the credit of the discovery on the ground of priority. We subjoin Lord Rosse's directions for its preparation :—

"I prepare the peroxide of iron by precipitation with water of ammonia from a pure dilute solution of sulphate of iron ; the precipitate is washed, pressed in a screw press till nearly dry, and exposed to a heat which in the dark appears a dull low red. The only points of importance are, that the sulphate of iron should be pure, that the water of ammonia should be decidedly in excess, and that the heat should not exceed that I have described. The colour will be a bright crimson inclining to yellow. I have tried both potash and soda pure instead of water of ammonia ; but after washing with some degree of care, a trace of alkali still remained, and the peroxide was of an ochrey colour till over-heated, and did not polish properly."

DEATH FROM THE FUMES OF ARSENIC AT PLYMOUTH.

The adjourned inquest to inquire into the cause of death of a little girl, named Helen Roberts, who was supposed to have died from the effects of the fumes of arsenic, emitted from a chemical manufactory adjoining the Cholera Hospital, in which the child had been placed, was held before John Edmunds, Esq., the coroner, at the Guildhall, yesterday. The evidence of the medical men who had attended the child had been taken at the last examination, and they were unanimous in the opinion that arsenic fumes were emitted from the chimney of the chemical works, and that those fumes were detrimental to the public health, if not actually poisonous. They also swore that the child's death arose from inflammation of the lungs, and that the irritating cause of this was these fumes, which she had absorbed into her system. To-day the defence was gone into, and several witnesses living in the immediate neighbourhood were called, and proved that they had never experienced any bad effects from the works being so near them, and that their health was uniformly good. The coroner having summed up in a very clear and lucid manner, after an absence of two hours the jury returned a verdict, "That the deceased met her death from inflammation of the lungs, caused by inhaling the arsenic in the loft."—*Morning Herald*, October 9.

FORMATION OF FLINTS IN CHALK STRATA.

(IN REPLY TO A CORRESPONDENT).

[A Correspondent wishes to know the origin of flints and of the calcareous spar which is sometimes enclosed within them; and also asks the name of some treatise on the subject. We presume he refers to the flints of the chalk strata.]

It is supposed that the silica of which the flint is composed has been deposited from water: that it was in a state of perfect fluidity is shown by the sharp moulds and impressions of organic bodies which it has taken. By the action of heated water and aqueous vapour on silica, Mr. Jeffery (*Reports of the British Association for* 1840) has shown that flinty matter readily becomes dissolved. At the present time, in both Iceland and New Zealand, siliceous depositions and incrustations are forming; and these may be taken as examples of the mode in which the flints of chalk were formerly produced. Thus we may assume that, by the action of hot water and hot aqueous vapour on quartz contained in granite and other plutonic rocks, a solution of silica would be obtained, and this, being erupted into the basin of the ancient chalk ocean, would explain the presence of flinty matter. Moreover, it is not to be forgotten that the siliceous skeletons of various poriferous animals and the siliceous contents of the intestines of the echini (which, as well as the porifera, are found in chalk strata) would act as nuclei on which the silica of the siliceous solutions would be deposited, as assumed by Dr. Grant (Lectures on Comparative Anatomy in the *Lancet*, Nov. 2, 1833). The remarkable power which some living beings possess of withdrawing silica from the waters of the sea and fixing it in their tissues, is well illustrated in the minute beings called *diatomaceæ*. These creatures feed on flint, and have siliceous indestructible bodies. According to Dr. Harvey (*The Sea-side Book*) great tracts of country are literally built up of their flinty skeletons.

The crystals of carbonate of lime (calcareous spar) are derived from depositions from solutions of supercarbonate of lime, which have oozed through apertures in the flint walls, and crystallized in the cavities of the flints. Moreover, it is to be presumed that the crystals were deposited from *cold* solutions; for crystals of carbonate of lime formed at a high temperature have the properties of arragonite, as Gustav Rose has shown (see *Pharmaceutical Journal*, vol. viii., p. 417, March, 1849).

We are not acquainted with any work specially treating of this subject, but most geological works contain some notice of it. Dr. Mantell's *Wonders of Geology*, and his *Geology of the Isle of Wight*, may be especially referred to with advantage.

MYLABRIS CICHORII A SUBSTITUTE FOR CANTHARIDES.

A Correspondent has sent a specimen of a blistering beetle, inquiring its name. It is the *Mylabris cichorii*, which is used in China. A few weeks ago the *Cantharis vesicatoria* was very scarce, and we were informed that it was likely to be replaced in the market by the Chinese variety, of which a few were imported. The colour of the body and head is dark brown, the wings light brown, with dark brown bars. They are said to be as efficacious as the *Cantharis vesicatoria*. A supply of this latter kind is now in the market, and may be had at the usual price.

THE FUMIGATION OF WHEAT WITH SULPHUR.

BY MR. H. C. ANDREWS.

While so many laudable efforts are being made to diminish the sale of poisons, I regret to find one important suggestion has been overlooked, or is not generally known.

In some counties it is customary to employ large quantities of arsenic for preventing "the smut" in wheat, and the farmers imagine nothing so effectual can be substituted. The same object may, however, be gained by fumigating the seed with sulphur. For this purpose an oast or drying kiln is best adapted, it being only requisite to expose the wheat to the fumes of sulphur in the same manner as hops and malt are dried with coke.

19, *Chapel Street, Belgrave Square, Oct.* 15, 1849.

ADULTERATION OF WHITE PRECIPITATE.

BY MR. J. B. BARNES.

Lately, upon examining a specimen of white precipitate which came from a city drug-house of some fame, to my surprise I found, upon heating a portion of it in a platinum capsule, there remained a very large amount of a *non*-volatile white powder, which, on further examination, proved to be carbonate of lime. I now repeated the experiment quantitatively, and found it yielded exactly fifty per cent. of carbonate of lime. The firm which supplied the article were informed of the fact; they candidly admitted that the *white precipitate* sent contained fifty per cent. of impurities, and by way of explanation stated that the article in question was sent in error, it being kept for their country customers only, who would not pay the price of the genuine article.

I hope the publication in your journal of this fraudulent adulteration will assist in putting an end to such disgraceful practices.

1, *Brook Street, Paddington.*

TABLE OF COMMERCIAL CINCHONA BARKS,

WITH THE BOTANICAL SPECIES FROM WHICH THEY ARE BELIEVED TO BE OBTAINED.

I. GREY CINCHONA BARKS.

§ I. Loxa Cinchona Barks. (Crown Bark *Angl.*—China-Loxa, Kron China *Germ.*)

Loxa Cinchona bark, grey compact	*Cinchona Condaminea* H. et B.
Loxa Cinchona bark, brown compact. (*Dunkele Ten China* Germ..—*China pseudo-Loxa* Bergen)	*C. scrobiculata* H. et B.
Loxa Cinchona bark, red chestnut.—Light Calisaya.	
Loxa Cinchona bark, red fibrous of the King of Spain (*Quina estoposa* Pav. in collect. Lamb. Mus. Brit.)	
Loxa Cinchona bark, yellow fibrous	*C. macrocalyx* Pav.

§ II. Lima or Huanuco Cinchona Barks. (Silver Bark, Grey Bark *Angl.*—China-Huanuco, Graue China *Germ.*)

Lima Cinchona bark, grey brown (*Cascarilla provinciana* Peruv.).	*C. micrantha* Ruiz et Pav. or *C. lanceolata* Ruiz et Pav.
Lima Cinchona bark, grey ordinary	
Lima Cinchona bark, white	? *C. purpurea* Ruiz et Pav.
Lima Cinchona bark, very rugous, resembling the Calisaya bark.—*Cascarilla negrilla* Peruv. (*? Cascarilla lagartijada* Laubert)	*C. glandulifera* Ruiz et Pav.
Cinchona bark, red of Jaen or of Loxa	?

II. RED CINCHONA BARKS.

(Red bark *Angl.* Rothe China *Germ.*)

Red Cinchona bark, becoming white in the air	?
Red Cinchona bark of Lima	*C. nitida* Ruiz et Pav.
Red Cinchona bark true, non-verrucous (*Cascarilla roja verdadera*, Laubert)	
Red Cinchona bark, officinal	
Red Cinchona bark true, verrucous	
Orange-red Cinchona bark, verrucous	?
Pale-red Cinchona bark with a white surface	
Brown Carthagena bark	
Red Carthagena bark	

III. YELLOW CINCHONA BARKS.

Yellow Cinchona bark of the King of Spain (*Cascarilla amarilla del rey.* Laubert.)	*C. Calisaya* Wedd
Calisaya Cinchona bark, or Royal Yellow bark (*Königs China* Germ.—*Yellow bark* Angl.—*China regia* Bergen)	
Orange yellow Cinchona bark—Cinnamon Cinchona bark (*quinquina—cannelle*), light Calisaya (*cascarilla claro-amarilla* Laub.)	*C. micrantha* Ruiz et Pav.
Pitaya Cinchona bark. (*Quinquina de la Colombie ou d'Antioquia* Guib. Hist. Nat. des Drog.—*Cascarilla parecida à la Calisaya* Laubert)	*C. Condaminea* Humb. et Bonp.
Woody Carthagena bark (*Quinquina de Colombie ligneux*)	
Orange Cinchona bark of Mutis (*Spongy Carthagena bark; New Spurious Yellow bark* Pereira).....	*C. lancifolia* Mutis.

HUAMALIES CINCHONA BARK. (Rusty Bark *Angl.*—China Huamalies, Braune China, *Germ.*)

Huamalies Cinchona bark, dull grey	*C. hirsuta* Ruiz et Pav.
Huamalies Cinchona bark, thin reddish	? *C. purpurea* Ruiz et Pav.
Huamalies Cinchona bark, white	?
Huamalies Cinchona bark, ferruginous	*C. micrantha* Ruiz et Pav.
Yellow Cinchona bark of Cuenca	*C. ovalifolia* H. et B.

IV. WHITE CINCHONA BARKS.

Ash-coloured Loxa Cinchona bark (*Ash bark* Angl.—*Blasse Ten-China* Germ.—*China Jaen* Bergen)...	*C. ovata* Ruiz et Pav.
Grey Cinchona bark, pale ditto	
White Loxa Cinchona bark.....	
White fibrous Jaen Cinchona bark	
Cuzco Cinchona bark	*C. pubescens* Vahl., or *C. cordifolia* Mutis.
Arica Cinchona bark	
Pale Yellow Carthagena Cinchona bark.—(*Hard Carthagena bark* Angl.—*Quina amarilla* Mutis.—*China flava dura* Bergen.)	*Ibid.*
Orange yellow Carthagena Cinchona bark (*Quinquina de Maracaïbo.—China flava fibrosa* Bergen).....	
Pitayon Cinchona bark, or false Pitaya Cinchona bark.....	?

The following, according to M. Guibourt, are the most active barks :

1. Calisaya Cinchona bark
2. Yellow orange "
3. Pitaya "
4. Verrucous true red "
5. Non-verrucous true red Cinchona bark
6. Red Lima "
7. Grey Lima "
8. Verrucous white Huamalies "

(Weddell, *Hist. Naturelle des Quinquinas*, fol., 1849.)

ALLEGED ADULTERATION OF TOBACCO WITH LIQUORICE.

ON Monday, the 24th of Sept., two of the Gloucester city magistrates adjudicated on a case of alleged adulteration of tobacco by Messrs. Biggs, of that city. The tobacco (484lbs.) had been seized by the Inland Revenue officers under the suspicion that it was adulterated with liquorice. It was attempted on the part of the Crown to recover from the defendants two penalties of £300 each for manufacturing adulterated tobacco on the

19th and 20th of July; and another penalty of £200 for having adulterated tobacco on their premises on the last-named day.

No chemical evidence was produced in support of the prosecution, the allegation resting on the assertion of Mr. George Phillips and other witnesses, that they had detected the presence of liquorice by the taste and smell. Mr. Phillips stated in his evidence—"With regard to the liquorice, we have no clear way of isolating it from tobacco; but from the examination we made we have every reason to believe that it was adulterated with liquorice. I should say that, from my experience and knowledge in these matters, I have no doubt of liquorice having been introduced into both samples—and salt certainly." It was also stated that there was an excess of soluble matter in some of the samples. In the absence of chemical proof great stress was laid on the circumstance that when the officer called, he had some difficulty in getting admission into the warehouse, which was adduced as collateral evidence of guilt.

Dr. Ure and Mr. Lewis Thompson, from their examination of samples of the tobacco, deposed that they considered it genuine good tobacco. Some of the samples had a sweeter taste than others. Genuine tobacco generally contained a portion of sugar and also salt. The ordinary method of isolating the sugar was by the process of fermentation; but Dr. Ure had adopted a process by means of which he could obtain the result with much greater precision. Mr. Herapath confirmed the evidence as to the quality of the tobacco.

Mr. Jenkins was preparing, on behalf of the Crown, to reply to his opponent, when the Mayor and Mr. Alderman Walker dismissed the information, on the ground that no proof had been substantiated.

Mr. Jenkins then gave notice of appeal. The Mayor upon this observed, that the Excise officers appeared to have anticipated the decision of the bench, as the notices were evidently "cut and dried" for service.

[A controversy has arisen out of this case among several of our chemical authorities, the question having been taken up in the *Daily News*. The point in dispute has reference mainly to the mode of estimating the amount of sugar in tobacco. Dr. Ure relies on the copper test (generally known as Trommer's test), which, with some modification, which he has adopted, is, he asserts, much more accurate and conclusive than the test of fermentation employed by Professor Graham and the two Messrs. Phillips. These latter authorities state that Trommer's test is not to be depended on, its indications being liable to fallacy. Mr. Lewis Thompson tells us that he has seen Dr. Ure's improvement on Trommer's test, and confirms his statement as to its accuracy. What this improvement is has not been published; and so long as the process is a secret, the profession have only the statement of those who are "behind the scenes" to guide them in forming an opinion. Professor Graham has detailed the precautions which he adopts in the fermentation test, and pointed out the principles on which its accuracy may be relied on. Until a similar disclosure is made on the other side, the two parties are not on equal ground.]

REVIEWS.

A MANUAL OF SCIENTIFIC INQUIRY; *prepared for the Use of Her Majesty's Navy, and adapted for Travellers in general.* Edited by Sir JOHN F. W. HERSCHEL, Bart. Published by authority of the Lords Commissioners of the Admiralty. 8vo, pp. 488. London: 1849.

Two or three years ago the Lords Commissioners of the Admiralty, at the suggestion and recommendation of their official chief, the late lamented Earl of Auckland, made a memorandum expressive of their

opinion that it would be to the honour and advantage of the navy, and conduce to the general interests of science, if new facilities and encouragement were given to the collection of information upon scientific subjects by the officers, and more particularly by the medical officers of her Majesty's navy, when upon foreign service; and their Lordships expressed their desire that for this purpose a Manual should be compiled, giving general instructions for observations and for record in various branches of science.

The following are the heads of inquiry indicated, and the names of the eminent authors who, at the particular and personal request of Lord Auckland, undertook to contribute to this important work:—

Astronomy	G. B. Airy, Esq.
Appendix	Sir F. W. Herschel.
Magnetism	Lieut.-Col. Sabine, R.A.
Hydrography	Captain Beechey, R.N.
Tides	Rev. Dr. Whewell.
Geography	W. J. Hamilton, Esq.
Geology	Charles Darwin, Esq.
Earthquakes	R. Mallet, Esq.
Mineralogy	Sir H. T. De la Beche.
Meteorology	Sir J. F. W. Herschel, Bart.
Atmospheric Waves	W. R. Birt, Esq.
Zoology	Richard Owen, Esq.
Botany	Sir W. Hooker.
Ethnology	Dr. Prichard.
Medicine and Medical Statistics	Dr. Bryson.
Statistics	G. R. Porter, Esq.

The different portions of this work have been drawn up by their respective authors with the greatest care and precision, and with great ability; and the work is altogether an indispensable companion to the observing traveller. It is not and was not intended to be one of very deep and abstruse research. The Lords of the Admiralty expressed their opinion that "its directions should not require the use of nice apparatus and instruments; they should be generally plain, so that men merely of good intelligence and fair acquirement may be able to act upon them; yet, in pointing out objects, and methods of observation and record, they might still serve as a guide to officers of high attainment."

We believe these suggestions have been strictly attended to, and that the work is what it was intended it should be. It is much to be regretted that Lord Auckland (who originally conceived the plan of the work, and to whose enlightened zeal for the improvement of science it owes its existence) did not live to see its completion. The Admiralty, with all its acknowledged defects, certainly deserves the credit of originating instructions of this kind. Previous to the sailing of the Antarctic expedition their Lordships requested the Royal Society to draw up a code of scientific instructions for the officers of the expedition. This duty was undertaken by the different committees of the Society, and a very interesting pamphlet of instructions was printed, but which was not purchasable, as the present *Manual* is, by travellers generally.

We shall from time to time republish from the *Manual* those *desiderata* which relate to Pharmacy. A very large portion of them

are such as Dr. Pereira (*Pharmaceutical Journal*, vol. iv., p. 11) proposed should emanate from the Pharmaceutical Society, and of which some lists (vol. iv., p. 443, and vol. vi., p. 73) have been published in this Journal.

MEDICAL AND ŒCONOMICAL BOTANY. By JOHN LINDLEY, Ph.D., F.R.S. With numerous Illustrations. London, 1849, pp. 274.

THIS work embraces the various useful plants employed in medicine, the arts, or in the many branches of domestic œconomy. They are of course arranged according to the natural system. Their generic and specific characters, their habitats, their qualities, and their uses are very concisely stated, and in a very large number of cases the description is accompanied by a figure.

To the student of medical botany, as well as to many other persons, this work is invaluable. The botanical descriptions are as concise as it is possible to make them, and Dr. Lindley's name is a guarantee of their fidelity. Considering that the book contains no less than 363 woodcuts, the price (14*s.*) is surprisingly low.

We shall select our illustrations of the work from the Thallogens, and pick out subjects which, though neither medical nor œconomical, are of general interest to the pharmaceutical student, on account both of the marked effects they produce upon the sources of our medicine or food, and of the interesting details of their microscopic structure.

Fungi.

Magnified figures of: Fig. 16. Mucor Mucedo; 17. Aspergillus glaucus; 18. Penicillium glaucum; 19. Uredo Caries, as it appears when rubbed in water; 20. Puccinia Graminis; 21. Botrytis infestans; 22. Æcidium Berberidis; 23. Tubercinia Scabies.

MUCOR. *Micheli.*

Microscopic. Cobwebby masses, consisting of tubular septate threads, bearing at the end a roundish membranous spore-case, which bursts when plunged in water.

1. M. *Mucedo* Linnæus.—(COMMON MOULDINESS.) Fig. 16.

Cobweb-like; the fertile threads simple; spores and spore-cases blackish.

Habitat. Fruit, paste, and preserves.

Quality. Destroys the quality of the substances it infests.

ASPERGILLUS. *Micheli.*

Microscopic. Cobweb-like strata, producing threads, at the ends of which grow spores arranged in rows, the rows themselves being collected in pencils or tufts.

1. A. *glaucus* Link.—(BLUE MOULDINESS.) Fig. 17.

Cobweb-like strata white; the fertile threads simple, capitate; spores loosely packed, becoming glaucous.

Habitat. Decaying substances everywhere. Cheese.

Quality. Assists in decomposition.

PENICILLIUM. *Link.*

Microscopic. Cobweb-like or mothery flocculent masses, producing simple globose *spores*, disposed in patches about the pencil-shaped ends of septate fertile threads.

1. P. *glaucum* Greville. — (THE VINEGAR PLANT.) Fig 18.

Mycelium forming a close tough crust-like or leathery web; branches somewhat entangled and bifid; spores verdigris-green.

Habitat. On decaying bodies, and in fluids in a state of acetification.

Quality. Assists in the decomposition of decaying matter, and augments rapidly the acetous fermentation of saccharine fluids. A bit placed in sugar and water soon changes it to vinegar.

UREDO. *Persoon.*

Microscopic. Subcutaneous patches, or masses of simple powdery spores.

1. U. *Caries* De Candolle—U. *fœtida* of some.—(BUNT. SMUT-BALLS. PEPPER-BRAND.) Fig. 19.

Spores black, rather large, spherical, fœtid.

Habitat. Within the ovary of corn; 4,000,000 may be contained in a grain of Wheat.

Quality. Destructive to corn, destroying all the interior.

PUCCINIA. *Persoon.*

Microscopic. Pear-shaped or oblong bodies, containing spores, having internal partitions, and furnished with a slender stalk, by which they are attached to an internal mycelium.

1. P. *graminis* Persoon. — (CORN MILDEW.) Fig. 20.

Pitch brown or black, growing in irregular lines, which become occasionally confluent.

Habitat. Leaves and straw of grasses.

Quality. Preys upon the juices of plants, especially of corn, and prevents the grain from swelling.

BOTRYTIS. *Micheli.*

Microscopic. Consisting of erect branched *threads*, at the ends of which grow clusters of spores (spore-cases).

1. B. *infestans* Montagne.—(POTATO MILDEW.) Fig. 21.

Tufts of threads, lax, erect, white, branching at the ends; spores lateral and terminal, solitary, oblong, with a granular nucleus.

Habitat. Leaves of the common potato.

Quality. Attacks the leaves and stems, and aggravates the disease to which this plant has become subject.

ÆCIDIUM. *Persoon.*

Microscopic. Cellular membranous sacs, bursting at the side or apex, and discharging numerous spores.

2. Æc. *Berberidis* Persoon.—(BERBERRY BLIGHT.) Fig. 22.

Forms roundish bright red spots, in figure elongated, bursting irregularly at the end, and becoming cups; spores orange.

Habitat. Leaves of the common Berberry.

Quality. A troublesome parasite, erroneously supposed to blight wheat.

TUBURCINIA. *Fries.*

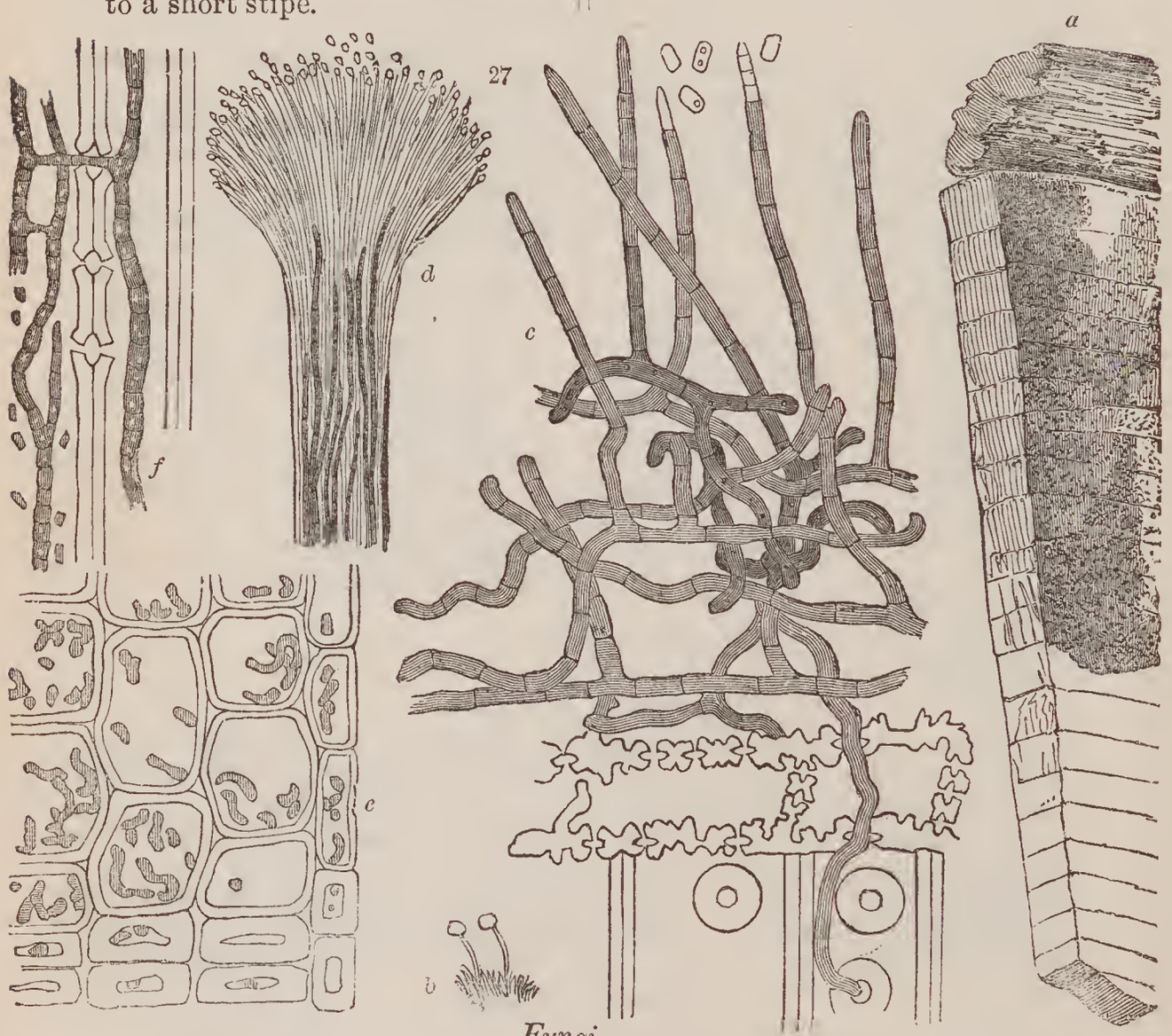
Microscopic. Hollow granular oblong balls, collected in subcutaneous patches.

1. T. *Scabies* Berkeley.—(POTATO SCAB.) Fig. 23.

Spots brown, oblong, becoming confluent; balls attached transversely to a short stipe.

Habitat. Beneath the skin of the tuber of the potato.

Quality. Produces superficial cavities and pits, but is of no further injury.



Fungi.

Various states of Graphium penicilloides; *a*, a piece of wood covered with it, of the natural size; *b*, a small portion, magnified 12 diameters; *c*, a portion very highly magnified, with a piece of the fir-wood out of which it grows; *d*, top of a thread in fruit; *e*, view of wood of Pinus infected by it; *f*, a vertical section of the same.—*Unger.*

GRAPHIUM. *Corda.*

Microscopic. *Stem* erect, fibrous, capitate, pencilled, floccose; flocci continuous, breaking off into continuous, homogeneous spores, which are glued together at first, but at last separate.

1. G. *penicilloides* Corda. Fig. 27.

Effused, black; stem even, black, opaque, brown in the middle, above pale dirty white; spores cylindrical, white, hyaline.

Habitat. Dead fir-wood and poplar-wood.

Uses. A destroyer of timber.

It is almost superfluous for us to say that we strongly recommend this work to our readers. It is, *par excellence*, the medico-botanical student's book.

ACCIDENT WITH SWEET SPIRIT OF NITRE.

ON Tuesday, the 23d of October, the premises of Messrs. Baiss, Brothers, and Co., Wholesale Druggists, of Lower Thames Street, were destroyed by fire, which was caused by one of the clerks pouring some sweet spirit of nitre from one vessel to another, near to an ignited lamp, which he had taken into the room where the spirit was kept. This accident should caution Druggists against the practice of visiting the ether-closet or room after dark with a naked candle.—An advertisement, relating to the fire, will be found in the first page of the Advertising Sheet.

TO CORRESPONDENTS.

A.P.S.—(1). In purifying salts with animal charcoal, the latter should be added to a solution of the former, and subsequently separated by filtration after promoting the action by the application of heat.—(2). Parnell's *Chemical Analysis.*—(3). Nooth's apparatus is figured in some of the old chemical works. It is constructed on the same principle as Woulf's apparatus; but the bottles are placed one above the other.

X.Y.Z.—(1). The Woorari or Urari poison is supposed to owe its activity principally to a species of strychnos employed in its manufacture; it most probably, therefore, contains strychnia; but we are not aware of its having been examined chemically.—(2). There are two tinctures of iron ordered in the Pharmacopœia: Tr. ferri sesquichloridi, and Tr. ferri ammonio-chloridi.

M.P.S.—The phosphorus might be separated, if in sufficient quantity to make it worth while, by distillation.

J. H. (Guildford).—(1). Mercury may be separated from tin by distillation.—(2). No previous notice is necessary.

F. J.—(1). We presume the formation of an emulsion by means of one of the fixed alkalis, would best fulfil the object required.—(2). We have no experience in the manufacture of fancy soaps.

A Subscriber.—Cyder may be converted into vinegar by exposing it to the air in a warm atmosphere.

Deodorisers and Disinfectants.—We had intended to notice the experiments of Mr. Rogers on the deodorising properties of charcoal, as well as some other processes, but we are obliged to defer it until next month.

C. D.—Probably the isinglass membrane plaster, used by the late Mr. Liston, would answer the purpose. Macord's plaster is spread on a silk fabric. His address is 58, Minories.

A Correspondent has sent us an analysis of Brande's Enamel; not having his name, we cannot publish the analysis. The value of such information depends on the authority.

M. P. S. (Scarborough).—We never heard of Murray's Specific for Gout and Rheumatism; probably, Sir J. Murray's fluid magnesia is the article. It is advertised as a cure for a great variety of disorders.

Sigma.—To remove grease spots from paper, sprinkle powdered French chalk over it, and hold a hot iron near it, stirring the powder that it may absorb the grease.—(2). To remove stains of nitrate of silver, apply iodide of potassium, and afterwards hyposulphite of soda, or tincture of iodine, and afterwards liquor potassæ. The former is the best method.

C. C.—In making extract of colocynth, it is usual to distil and save the spirit.

A Founder.—In the estimation of income-tax in a Chemist's business, the expense of Assistants should of course be deducted. In some houses, this amounts to several hundreds a year. The principle is the same whether one Assistant be kept or six. Every business should be estimated by the actual profits calculated from returns, expenses, &c., not from a hypothetical formula deduced from the gross returns. The profits vary according to the business.

Camber.—(1). No person can legally sell patent medicines without a licence.—(2). Holloway and his tribe are not exempt.—(3). All are taxed.—(4). A person proved to have obtained admission to the Pharmaceutical Society by means of a fraudulent certificate, may be expelled by the Council, on the fact being substantiated. Our Correspondent states that he is cognizant of a case or cases of this fraud, and considers this "the chief obstacle to Pharmaceutical reform."—[If so, the fault rests with those who *know the facts*, and do not report the same to the Council.]

W. T. (*Bolton*).—Caution to Chemists.—The individual, once a Chemist, then something else, and now a plausible adventurer, having worn out his friends in London, is perambulating the country and levying "black mail" upon strangers. Before giving him any money it would be well to inquire at his hotel how much is due for brandy and water. He is free in borrowing any sum from ten shillings upwards, but never thinks of re-paying. Some of his tricks while in London would amuse our readers.

L. (*Newcastle*).—See *Selecta e Prescriptis*, which every apprentice asking such questions should obtain and carefully study.

Inquisitor.—(1.) We never heard of any book which would teach the treatment of diseases.—(2.) Nitro-muriate of tin (or dyer's spirit) is made by dissolving tin in nitromuriatic acid. The proportions are varied according to the colour required.

Alpha (*M. P. S.*)—(1.) The authority named does not require the confirmation of our opinion.—(2.) We have no remark to make about the powder, except that by heating it in an oven a portion of the essential oil would be driven off.—(3.) Alkalies have been recommended in cholera.—(4.) Robins's filter is a good sort.—(5.) Lime-water would be the result.

A Registered Apprentice (*Carlisle*) cannot be examined at Apothecaries' Hall unless he is apprenticed to an Apothecary. The examination comprises medical and surgical subjects.

A Subscriber from the Commencement.—(1.) Caoutchouc may be dissolved in oil of turpentine or in coal-gas naphtha, with the aid of heat.—(2.) There is no *authorised* formula for the liquid sold under the name of *chloric ether*, but its *recognised* composition is one part of chloroform dissolved in seven or eight parts of rectified spirit.

H. D. C.—Sulphuret of ammonium or potassium would probably produce the effect required.

Erratum.—Page 211, line 7, *for* 6lbs., *read* 6ozs.

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the Editor, 338, Oxford Street, before the 20th of the month (if Answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. IX.—No. V.—DECEMBER 1st, 1849.

THE SALE OF POISONS.

Some of our Members have erroneously imagined that the Council, in appointing a Committee to consider this subject, contemplate the introduction of a stringent and sweeping law restricting the sale of poisons in general. We have heard it argued that almost all medicines are poisons, and that on this account the discussion which is taking place is chimerical and absurd. We agree in the premises, but not in the inference.

That fatal accidents and crimes frequently arise from the unrestrained sale of poisons is a known fact. That in many cases accidents result from carelessness or ignorance is undoubted, nor will it be denied that the free trade in poisons places the means of destruction in the hands of the criminal. The purport of the inquiry is this :—Can any precautions be adopted which would diminish the danger, and thus be instrumental in saving human life?

This is not a new question. It was agitated in the year 1835, and a Bill was prepared for Parliament which was intended to place the sale of poisons under strict regulations. The framers of the Bill were not practically experienced in the commercial details of the question, and when the Chemists discovered what was in contemplation they united in opposing it. A meeting was held, and as soon as the impracticability of the scheme was made known the Bill was withdrawn.

The subject has been again discussed by the Provincial Medical and Surgical Association, in consequence of numerous cases of poisoning which have recently occurred. But instead of hazarding a Bill in Parliament, founded on imperfect data, the Members of the Association have appealed to the Pharmaceutical Society for such information and assistance as our Members may be able to give.

We contend that no law affecting Chemists and Druggists should be introduced without a previous consultation with the representatives of our body; and that whenever an application of this kind is made, it should meet with mature and respectful attention.

The result of the inquiry will depend upon the nature of the evidence and information obtained; and, in order to make the inquiry effectual, the Council have thought it right to appeal individually to every Member of the Society for answers to a series of questions which place the subject in a practical form. Whatever may be the ultimate decision, some advantage is likely to arise out of the inquiry. It is a subject upon which every Chemist has an opinion as well as experience, and if all our Members will answer the questions the answers will be a valuable statistical record.

In the event of some legislative precaution being found practicable, the Society will have accomplished that which has often been attempted in vain.

In the present instance we are acting conjointly with an influential Medical Association, a Committee of which is also appointed with the same object. During the communications which will take place

between the two Committees we shall have an opportunity of pointing out the importance of regulating by law the qualifications of Chemists and Druggists, and proving that the recognition desired by our body would not in any way be injurious to the interests of Medical Practitioners, while it would greatly facilitate the introduction of precautionary measures in the sale of poisons.

Several correspondents have directed our attention to a letter by the Rev. Mr. Montgomery, in the *Times* of Nov. 13, in which he denounces Chemists as "venal poison-mongers," who "traffic for pence in murder.' We had previously seen the letter, but thought it unworthy of a reply. To whom does the reverend gentleman allude? Does he mean the respectable and legitimate Chemists, or the blue-bottle variety of the genus? We presume the latter. At all events, unless the cap fits there is no occasion to put it on. As long as the term Chemist is indefinite, we pay no attention to clerical compliments of that description.

PROVINCIAL PHARMACEUTICAL ASSOCIATIONS.

Soon after the establishment of the Pharmaceutical Society, the Council encouraged the formation of provincial branches, and suggested that in every town a secretary should be appointed, as well as other officers, where the numerical force of the members afforded scope for active and systematic proceedings. Periodical meetings were recommended, and reading-rooms, with other means of spreading useful information, were established in many places. In some large towns or cities arrangements were made for the delivery of lectures, and the Council, under certain conditions, voted grants of money or books to such an extent as circumstances required, and the gross amount of subscriptions received from the locality appeared to justify. In the first instance the plan appeared to work well. It was warmly adopted at Manchester, Bristol, Bath, Norwich, Birmingham, and Exeter; and in some small towns libraries or reading-rooms on a moderate scale were established. But soon afterwards the subscription of the Society was reduced from two guineas to one, in compliance with the expressed wishes of a majority of the country members. By this means the funds became inadequate to the purpose of assisting provincial schools, and these, being unable to support themselves, relapsed into a latent state. But, though latent, the spark was not extinguished. Local associations are springing up, having the same objects, but a different constitution. They are independent and self-supporting.* Their members are not of necessity members of the Pharmaceutical Society, but all the Chemists of the locality are eligible for election. This gives the associations a wider range; it removes invidious distinctions which formerly existed, when non-members were admitted at a higher rate of subscription; and while the whole responsibility is thrown upon the Chemists residing in the locality, the whole credit of the proceedings is also due to them.

A question may arise in the minds of some of our readers,—Is this division of the entire body of Chemists into independent committees

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* We ought to mention, that at Leicester and Colchester the Chemists have been associated for many years.

likely to detract from, and weaken, the parent Society, which was intended to comprise all the qualified Chemists in the kingdom? We think not. The habit of associating together for purposes of instruction and improvement will tend to cement that harmony among Chemists generally which must increase our strength and influence. The more complete the organisation in all its parts, the more readily will the united forces become available for the benefit of the entire body, on the occurrence of any emergency. The emulation naturally existing between the several associations is likely to stimulate each, and the circulation of information respecting the proceedings of the parent Society is, we think, more likely to add numbers to our ranks, than to produce an opposite result.

If any of our members should suppose for a moment that, because there is an association in their town, the Pharmaceutical Society is no longer necessary; that, because they have local meetings, the grand scheme of uniting all the Chemists of the kingdom into one body is not worthy of encouragement; it is easy to show that this is altogether a delusion. To insure success in a project of this magnitude, there must be a rallying-point. The Society may be compared to a large machine, of which all the parts should be perfect in themselves, and all combined to produce the desired effect.

In education, each local school may be a valuable auxiliary, but none can supersede the school in the metropolis, where advantages are offered to all the country members who may desire to send their sons or their apprentices to complete their qualification. In regard to protection, the organised influence of each local association would be inoperative, unless these associations are combined and their influence concentrated. The Benevolent Fund is confined to the parent Society, and this has already afforded relief to members and associates in the country, who, at the time they joined the Society, little expected to become applicants. Thus, in every respect, the zealous and continued support of the original Society is essential to the welfare and efficiency of the local associations, which, however constituted, must be considered as branches, actuated by the same motives, and assisting in the same objects.

The promulgation of these facts through the medium of the local associations should induce those who have not already joined the Pharmaceutical Society, seriously to consider whether they are acting fairly to their brethren by withholding their share of support from an undertaking which is intended to benefit all, and whether by this means they are not instrumental in retarding the result which every Chemist who has a proper respect for himself, and desires to raise the character of his profession, ought to promote.

THE MEDICINE STAMP ACTS.

ANOTHER ILLUSTRATION OF A PREVALENT SYSTEM OF FRAUD.

The prosecutions under the Stamp Acts have been of late less frequent than they were formerly, on account of the principles of the Acts being better understood. The informers, apparently fearful of losing their situations for want of employment, are continually contriving some ingenious trap in which to catch the unwary.

The following case exemplifies a system which demands exposure and punishment, a trick by means of which the innocent are as likely to suffer as the guilty. In fact, no Chemist is safe while such practices are tolerated:—

On the 13th of November, Messrs. Smeeton and Son received one of the usual intimations from Mr. Timm, to the effect that they had incurred the penalty of £10, for having sold on the 3d of September a bottle of Cholera Mixture without a stamp. The mixture in question was not liable, being an ordinary chalk mixture in accordance with the general instructions of the Board of Health, and sold without any recommendation. The label simply stated the dose, and when to be taken, the name of Messrs. Smeeton and Son being on another label. On enquiry at the Stamp Office, it was discovered that the bottle had been sent there enveloped in a printed recommendatory paper, describing Pickering's Cholera Mixture, quite a different preparation, for the sale of which Messrs. Smeeton and Son are agents.

A bottle of each having been forwarded by Mr. Smeeton to the Editor for comparison, it was found that the first (Smeeton's Mixture) was exactly like the one at Somerset House, the bottle being an ordinary flat half-pint. The other (Pickering's Mixture) was in a moulded bottle of different form, stamped, and enveloped in the printed paper.

It appeared therefore that the informer had purchased a bottle of the mixture which was not liable, enclosed it in one of the printed papers so as to make it liable, and then had forwarded it to Somerset House with an information. The label containing the name of Messrs. Smeeton and Son had been removed from the bottle, otherwise the Commissioners would have detected the fact that the printed paper and the medicine had no relation to each other. The removal of the label clearly proves that the act of the officer was a fraud and not a mistake. As Messrs. Smeeton and Son never send out a bottle of that mixture without their name on it, there can be no doubt as to the culpability of the officer. The price of the mixture (1*s.* 6*d.*) did not agree with either of the prices on the paper, namely, 1*s.* and 2*s.* 6*d.* This, however, appears to have been overlooked until the investigation took place. It is clear that any Chemist who allows any such printed paper recommending proprietary medicines to lie on his counter is in danger of a similar imposition.

In a recent number we reported a case (also occurring at Leeds) in which a wrapper had been thus obtained and a fabricated article enclosed in it, differing in every respect from the mixture to which the wrapper applied. We were informed at the time that the culprit had been dismissed from his situation. On the present occasion we are told that the offender is an experienced officer who has been many years in the service, which appears to be considered an obstacle to his dismissal. We think, on the contrary, that an experienced officer, who proves himself to be unworthy of confidence, is a very suitable person to select as an example for punishment.

We intend to revert again to this subject.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

SALE OF POISONS.

The Committee appointed to consider the practicability of adopting measures for Preventing Accidental and Criminal Poisoning met on Tuesday, the 20th of November. Mr. Squire, President, in the Chair.

After some discussion on the general merits of the question, and the various means which had been suggested for restricting the sale of poisons, the Committee resolved that it would be impossible to arrive at any definite conclusion until the facts connected with the sale of poisons in different parts of the country were collected and arranged in a tangible form. It was evident that the custom in regard to the sale of arsenic in London would form no criterion respecting it in country towns, and in other respects local circumstances would materially affect the merits of the question. In accordance with this view, the Committee prepared a series of inquiries, a copy of which has been sent to each Member of the Society, with a circular, which is subjoined.

At the time of going to press, above 700 answers had been received. The Committee hope that all the Members of the Society, wholesale as well as retail, will send replies, otherwise the return will be incomplete.

London, November 13th, 1849.

Sir,—The accompanying Questions are issued by a Committee of the Pharmaceutical Society, appointed by the Council to take into consideration the "Sale of Poisons," especially of Arsenic, with a view of ascertaining whether any means could be adopted for preventing accidental and criminal poisonings.

The Questions are addressed to the Members of the Society generally; and the Committee will feel obliged if you will favour them with Answers to such of the Questions as may come within the scope of your experience or knowledge.

The Committee will be glad also to receive information on any other points relating to this important subject.

An early answer is particularly requested, as the Committee will meet again before the expiration of this month.

George Walter Smith, *Secretary.*

QUESTIONS ON SALE OF POISONS.

Do you sell arsenic?

Under what regulations do you sell it?

For what ostensible objects is it usually demanded?

By what class of persons?

For what trades or manufactures is it required by your customers in small quantities?

Is it sold by oilmen, grocers, and general dealers in your town?

Would the prohibition of its retail sale be, in your opinion, desirable?

How many cases of poisoning by arsenic in your neighbourhood have come to your knowledge during the last twelve months, whether criminal or accidental?

In what manner do you send it out—in paper, bottles, or jars; and is it always labelled "*Poison*"?

Are you aware of any accidents attending the use of arsenic as sheep-wash?

Are you aware of any accidents resulting from its use in steeping wheat ?

Are poisons generally sold by oilmen, grocers, and general dealers in your neighbourhood ?

EVENING LECTURES.

Mr. Redwood commenced his evening Lectures on Electricity and Magnetism on Wednesday, the 14th of November. The magnetism of the loadstone and of artificial magnets, including a description of magnetic polarity and induction, the methods of making artificial magnets, the bodies susceptible of the influence of magnetism, and the conditions under which the force is retained by those bodies to which it has been communicated, formed the principal subjects of the first Lecture. The large *electro-magnet*, probably the largest that has yet been made, which has recently been presented to Mr. Redwood by the late President of the Society, Mr. Morson, was used for showing the direction of the magnetic curves ; but the full development of the powers and capabilities of this instrument, which weighs nearly six hundredweight, was reserved for the lectures on electro-magnetism, which will come at the end of the course. At the conclusion of the first lecture, the large natural magnet, with which Faraday first obtained the electric spark from the loadstone, was used for this purpose. The whole of the apparatus used in this interesting experiment was that originally employed by Faraday. The lecturer stated that he was indebted for the use of this apparatus to Professor Miller, of King's College, to whom it now belongs. The experiment was introduced to establish the connexion between magnetism and electricity.

The second Lecture, on the 21st of November, was devoted to the commencement of the subject of frictional electricity.

The rooms were densely crowded on each occasion.

BIRMINGHAM PHARMACEUTICAL INSTITUTION.

SECOND ANNUAL MEETING,

HELD AT THE STORK HOTEL, OLD SQUARE, NOV. 22, 1849,

MR. W. SOUTHALL, PRESIDENT, IN THE CHAIR.

The following is an extract from the Annual Report :—

SCIENTIFIC MEETINGS AND LECTURES.

The scientific meetings and lectures have occupied the largest share of the Committee's attention, as it was considered that they would be the best and most acceptable means of diffusing knowledge; but the result has not been so satisfactory as anticipated. The meetings have, it is true, been more numerously attended than in 1848, and several interesting practical papers have been read, yet the members generally do not appear sufficiently to appreciate these opportunities of gaining and communicating information.

The Committee must again solicit more numerous contributions of papers. It is not requisite that they should be either entirely original or elaborately studied: the object of their production will be answered if any subject is illustrated so as to render it more easy to comprehend. Papers should, if possible, be forwarded to some member of the Committee before the third Monday in each month, and likewise notifications of specimens for exhibition, or of any subject it may be desired to discuss.

In the summer, meetings were held every Tuesday evening for reading papers and conversation on botanical subjects; at which collections of indigenous plants were provided for the members to study and obtain specimens from.

At the winter meetings, papers were read by Messrs. T. W. Holdsworth, A. Bird, T. Southall, W. Southall, and J. Horncastle; and at the concluding meeting for the season Mr. Wrightson exhibited some tests to explain the reaction which often takes place when solution of iodine of potassium is mixed with sweet spirit of nitre, on which he offered some valuable practical suggestions.

Professor Shaw's course of fifteen lectures on Chemistry was subscribed to by thirty-one members and students ; but the Committee regret that the attendance was neither so numerous nor so regular as could have been wished. In justice to Mr. Shaw it must be stated, that he took much pains in explaining and illustrating his subject, in such a manner that his instructions might be easily understood and remembered. This course was intended to form the first part of a series of lectures, in which it was proposed to treat very fully of the elements of Chemistry; the subjects already treated of were therefore chiefly of an introductory character, comprehending the fundamental laws of Chemistry, and other preliminary subjects with which the most experienced Professors generally commence. The continuance of this course is much desired by the Committee, and they hope that before long it will be resumed ; but as so small a number of members have been able to attend regularly, it is thought advisable to defer it till more convenient arrangements can be made.

During the ensuing winter a lecture will be delivered on the third Friday in each month. The subjects and lecturers' names will be duly announced. Meetings for reading papers and conversation will be held on the first Friday of each month.

Mr. W. Southall and Mr. J. Sumner have acted with the secretary as a sub-committee to superintend the meetings and lectures for the past year.

THE LIBRARY.

The library has hitherto been the most successful department of the institution. Its direction last year was intrusted to a sub-committee, consisting of Mr. Taylor, Mr. Oakes, and Mr. W. Southall, jun., whose services the Committee are happy to acknowledge. The number of entries of books in the register is two hundred and fifty-eight; and as they have usually been kept the full time allowed, and very frequently re-entered by the same member, it may be presumed that they have been well studied. It is also worthy of remark that the Library has been chiefly frequented by assistants and apprentices. The number of books circulated from January to March was ninety-three, being an increase of seventeen over the circulation of the corresponding three months of 1848. The average of the rest of the year was about the same as that of the corresponding portions of 1847-8.

As the library is available to all the members of the Institution, some of whom are so circumstanced that they cannot attend meetings or lectures, it has been resolved to bestow upon it a greater share of attention. The Committee have likewise determined to establish a Reading-room, which will be open five days a-week, and will be supplied with some of the leading periodicals on Chemistry and Pharmacy. The requisite regulations have received the sanction of the Committee, and will speedily be published and forwarded to each member.

The report also contains a list of the books in the library.

BRISTOL CHEMISTS' ASSOCIATION.

This Association has entered upon its third lecture session. The facilities afforded by the Bristol Medical School have enabled the Council to offer to the Assistants and Apprentices of that city the opportunity of attending Lectures on Chemistry, Materia Medica, and Botany. The Professors of the school have promoted this arrangement by reducing the fees, in the case of *young men belonging to the Association*, to the scale adopted by the Pharmaceutical Society at the School in Bloomsbury Square. For this liberality the students are greatly indebted to the Professors, Mr. Herapath, Dr. Staples, and Mr. Thwaites, who have done all in their power to assist in the object in view.

AT A MEETING OF THE ASSOCIATION,

HELD ON THE 12TH NOVEMBER,

RICHARD FERRIS, ESQ., PRESIDENT, IN THE CHAIR,

Mr. JACOB BELL, having been invited by the Council to deliver the opening address, availed himself of the opportunity of giving an outline of the objects and progress of the Pharmaceutical Society, the course of education adopted by that Society, and the probable influence of improved qualification on the professional, social, and commercial character of the pharmaceutical body. Although the Bristol Chemists' Association had no official connexion with the Pharmaceutical Society, he considered it a branch of that institution, inasmuch as both were treading in the same path, with the same objects, and each was likely to be strengthened by harmonious co-operation and correspondence with the other. Circumstances which occurred nine years ago had rendered necessary some decisive measures on the part of the Chemists and Druggists to protect themselves against the vexatious attacks to which they had been previously exposed on the ground of their alleged incompetence. It was not creditable to the body to continue a course of self-defence on commercial grounds, when the ostensible motive for the interference of Mr. Hawes and others had been the desire to introduce educational improvements into the profession of which the Chemists constituted an important branch. Even the victory under such circumstances would have been a disgrace, if it had not been followed up by a systematic plan for diving to the root of the evil, and removing its cause. A society of a high scientific character would have been incompatible with the elements of which the body was at that time composed—they were not ripe for an exclusive and philosophical institution. It was necessary to progress by degrees, and to adapt the constitution of the Society in some degree to the habits and views of those for whose benefit it was projected. Accordingly the protection of the general interests, and the advantages of a benevolent fund, were added to the educational improvement, which was the most important feature in the institution. All persons already in business as Chemists and Druggists were invited to become members, and those assistants and apprentices who desired to be on the list of founders were admitted as Associates.

Mr. Bell briefly adverted to the nature and importance of the duties of the Pharmaceutical Chemist, and the branches of knowledge required for their efficient performance—a subject so ably treated by Dr. Fripp in his introductory address to the same association last year, that it is needless to recapitulate it.

A comparison was then drawn between the Pharmaceutical Chemists in other nations and the same class in Great Britain, allusion being made to the state of pharmacy in France, Germany, Russia, Norway, Sweden, Belgium, Poland, Spain, Portugal, Italy, America, Mexico, and our colo-

nies, the peculiarities of each being briefly stated. From this it appeared that in nearly all the European nations rigid laws exist obliging the "Pharmaciens" to occupy a certain number of years in study, to attend lectures, and to pass a series of examinations before they can commence business on their own account. Even in our colonies young men were obliged to qualify, and two of the pupils at Bloomsbury Square had come from the Mauritius to England on purpose to pass the examination, and obtain the diploma, without which they could not carry on business.

These considerations, among others, had influenced the founders of the Pharmaceutical Society, who felt ashamed that in Great Britain, a nation generally held up as an example for the world, Pharmacy should be degraded to the level of a mere trade, in which no education was by law required, while in almost every other civilised nation it enjoyed the rank of a profession. It appeared right that reform should commence at home. The Chemists had determined to resist interference; they were conscious that there was much room for improvement, and that their interest as well as their character demanded the introduction of a regular system of education, and a distinction between the qualified and the unqualified. The rational and creditable—in fact, the only practicable—mode of effecting the object was to undertake it themselves, and, having organised their Society, to apply for a Charter and an Act of Parliament, in order to give it permanence, stability, and effect.

There were many obstacles to be overcome, and of these none was more formidable than the apathy and indifference of those who kept aloof, because they could not perceive any direct connexion between professional character and commercial success; who desired protection and a quiet life, but could not imagine in what manner education could be concerned in the attainment of these objects. It was difficult to convince by arguments merely theoretical, founded on anticipation and analogy; and so little interest did the question excite that, when Mr. Bell (eight years ago) invited all the Chemists of Bristol to meet him at the "Talbot" for the purpose of discussing it, he could only muster six, including himself. The present numerous assembly was an encouraging contrast, showing that a reaction had taken place, and that the labour of eight years had not been thrown away. He had also visited other cities and large towns, in one of which, where there were about sixty Chemists, only two could be induced to call at the house of a third to meet a brother Chemist who had travelled 200 miles to introduce this important subject to their notice.

That which could then be only stated problematically could now be demonstrated by an appeal to facts: the influence of education on self-defence and commercial prosperity had been made obvious by experience, and the character of the whole body had been raised in the estimation of the profession and the public, both at home and abroad, by the measures which had been adopted for promoting education and advancing the art and science of pharmacy. The Chairman of a Parliamentary Committee had informed a deputation of the Society that the only ground upon which any application for protection or privileges could be admissible was the improved qualification which the School of Pharmacy was designed to introduce; and it was obvious that by no other means could any reasonable prospect exist of obtaining an Act of Parliament, which, sooner or later, must be the result of the measures in progress.

The Society had proved valuable as a bond of union and means of defence, having been instrumental in throwing out several obnoxious Acts of Parliament, among which might be mentioned the objectional clauses of the Spirit Licence and Duties Bill. By this alone, the Members had been saved from the contemplated jurisdiction and interference of Excise officers, and a tax of two guineas a-year. In many other respects the Society was useful to Country Members, many of whom had been relieved of penalties

under the Stamp Act by the exertions of the Council, individually or collectively, on their behalf.*

In conclusion Mr. Bell adverted to the necessity of supporting the Pharmaceutical Society, observing that the Bristol Association was a valuable auxiliary, and as such it might continue to prosper and gain fresh strength; but if the Parent Society were to wither, its branches would die as a natural consequence. Such a result was not to be apprehended, but an undertaking of that description required continual energy and perseverance to maintain its ground; and every stimulus which could be brought to bear upon it should be taken advantage of in order to keep the interest alive, and prevent any relapse into lukewarmness and apathy.

Reverting to the dates at which Pharmacy was recognised by law as a profession, and placed under educational regulations, it had been stated that in some nations this had been the case as early as the 13th century, in others the 14th, 15th, 16th, and 17th. No nation in Europe except Great Britain had delayed this branch of legislation until the present century. But, although last in the field, it was not likely that Great Britain would long remain in the rear. It was a characteristic of Englishmen to outstrip their neighbours, and it could scarcely be supposed that the Pharmaceutical Chemists would be content to remain an exception to this general rule.

The Chairman having invited the members present to make any observations or inquiries on the subject before the meeting,—

Mr. Herapath alluded to the examinations of the Society, and inquired whether it was in contemplation to give to those who passed, a diploma differing from the ordinary certificate of membership. He considered the value of the diploma greatly reduced by the fact that a certificate exactly similar to it could be purchased by a pecuniary subscription. He also thought it would be policy on the part of the Council to encourage three or four provincial schools in places where facilities existed, and to contribute liberally to the funds, so as to ensure the efficiency of these branch establishments. For instance, at Bristol a very useful school might be organised and carried on in the same manner as the medical school, in the formation of which he (Mr. Herapath) had taken an active part, and which was in a flourishing condition.

Mr. Bell, in reply, observed that the Council had maturely considered the propriety of adopting a different diploma for members who had passed the examination. But it was found that this would involve the necessity of a radical change in the mode of admission. The subscription being annual, those who discontinued the payment were obliged to return their certificate. Now, if this certificate had been the result of an examination, it would not be fair to claim it on pecuniary grounds. Another certificate of examination was therefore given, and the original certificate of membership (or diploma as it was sometimes called) continued to be held during membership and no longer. When the Society was in a position to claim the fee in one payment, the alteration proposed by Mr. Herapath could easily be carried out, and this would most likely take place as soon as it was thought prudent. In reference to the suggestion for grants from the Council to provincial schools, Mr. Bell stated that the Society was not in a position to adopt this course on a scale likely to be efficient. The experiment had been tried, and it was found expedient to abandon it for the present. If all the Chemists in Bristol had been members, instead of rather less than half the number, and if it could have been shown that such assistance would be the means of securing the desired result, the question might have been entertained. The Council were desirous of promoting

* At page 252 of this number will be found another case.

education generally, and co-operating with the provincial members in this object, so far as the means at their disposal would permit.

The Chairman expressed his opinion that the explanation given by Mr. Bell, as well as his general report respecting the progress and utility of the Society, had been satisfactory, and he hoped that the Bristol Chemists' Association would continue to prosper, and would furnish from time to time reinforcements to the ranks of the Pharmaceutical Society.

Several other members having expressed similar opinions, and the usual votes of thanks having been passed, the meeting separated.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Colquitt Street, Friday Evening, October 26th,

THE PRESIDENT IN THE CHAIR.

Dr. NEVINS resumed his lecture on Specific Gravities, and went through the several processes which are adopted with reference to solids and gases. In alluding to the mode of determining the specific gravities of powders, he pointed out the importance, on weighing the powder in water or other liquid, of removing the air-bubbles which sometimes remain attached to the solid particles, and recommended the use of the air-pump for this purpose.

A paper was read, entitled

SOME REMARKS ON THE BLOWPIPE REACTIONS OF STRONTIA, BARYTA, &c.

BY DR. SHERIDAN MUSPRATT,
Professor of the Liverpool College of Chemistry, &c. &c.

STRONTIA and Baryta were at one time supposed to be identical. Crawford and Sulzer, however, established their dissimilarity, but the existence of strontia was first proved by Hope and Klaproth nearly sixty years ago. Although these earths have been so long known, still their pyrognostic properties, and those of their salts, have not been accurately studied. In several leading treatises on Chemistry I observe the following: "Strontia salts impart a crimson colour to flame." My students always precede the nascent testing by an examination in the dry way, with the view of ascertaining the presence of those substances yielding characteristic colours to the flame, sublimates, unmistakable reductions, &c. Mr. Noad states, in his *Chemical Manipulation and Analysis*, "Before the blowpipe sulphate of strontia fuses to an opalescent mass, and colours the outer flame carmine red." This reaction has not been obtained in my laboratory, for when I had given an insoluble salt of strontia, *e.g.*, the sulphate, its base was invariably mistaken for calcia (lime); *i.e.*, it afforded a yellowish-red flame, collaterally with a brilliant phosphorescence on the assay. I have lately performed several experiments in order to collect satisfactory blowpipe reactions with regard to strontia and its salts. Sir Robert Kane remarks, in his edition of *Elements of Chemistry*, that "Strontia is distinguished from baryta by tinging the flame of the blowpipe a rich crimson." Caustic strontia, dry or moist, has not the slightest characteristic effect before the blowpipe, and only *its moist soluble salts* impart a fine crimson tinge to flame. Sulphate of strontia, phosphate of strontia, and carbonate of strontia, do not, *under any circumstances*, tinge the apex of the flame. Even chloride of strontium when *dry* does not impart a carmine colour to the flame of the blowpipe, but on being moistened with a drop of water, and submitted to the point of the blowpipe flame, an intense crimson hue pervades the whole combustible, which disappears when the water is evaporated. Mr. Noad also states, with regard to baryta, that "before the blowpipe baryta cannot be detected."

Does he mean caustic baryta or baryta in combination ? Caustic baryta imparts a yellowish colour to the flame, but the chloride of barium, the nitrate, and especially the acetate of baryta, give a fine siskin green to the whole flame. When chloride of barium and nitrate of strontia are mixed, equal weights being taken, the strontia reaction predominates. Acetate of baryta with nitrate of strontia in equal proportions deflagrate, and yield a greenish-yellow flame not at all indicative of the latter. This proves that the acetate of baryta affords, as above stated, a more decided reaction than any other salt of this earth. Desiccated acetate of strontia gives no characteristic reaction, but, when kneaded into a paste with a few drops of water, it imparts to the apex of the blue flame a most brilliant crimson. Chloride of barium, when mixed with chloride of strontium, does not prevent the strontia reaction, even if the former be in great excess. When the chlorides of barium, strontium, and calcium are incorporated, the carmine flame alone is perceptible. The slightest trace of soda or any of its salts hides the strontia reaction, the intense yellow from soda pervading the whole flame. Moist soluble strontia salts, with a salt of potassa, give a faint indication of both bases ; the crimson colour is seen in the flame of the lamp, and the violet tinge on the assay.*

Mr. Danson read a paper

ON THE CARBONATE OF SESQUIOXIDE OF IRON,

in which he states that the precipitate obtained by adding carbonate of ammonia to sesquichloride of iron, washed with cold water, and subsequently dried over oil of vitriol, was found to have the composition represented in the annexed formula : 7 $Fe_2 O_3$, 3 CO_2 + 18 Aq. or 3 ($Fe_2 O_3$, CO_2) + 4 ($Fe_2 O_3$, HO) + 14 Aq.

DECOMPOSITION OF BELLADONNA JUICE.

Mr. H. S. Evans described a curious decomposition, accompanied by the disengagement of red vapours, which had occurred in some expressed

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* The following observations on Dr. Muspratt's paper have been since sent by a Member of the Society to the Secretary :—

I believe Dr. Muspratt will find, on referring to many leading works, that the fact of insoluble and desiccated salts of strontia, baryta, &c., giving no blowpipe reaction, has not been overlooked or slighted ; on the contrary, it appears to me to be generally understood and well known; indeed, stress is usually laid on the term "moist," soluble in reference to the salts of the earth. This I have observed in Fresenius, Parnell, Gmelin, &c.; but the facts mentioned in Dr. Muspratt's paper are particularly pointed out and dwelt upon in a little book published in 1838, by Griffin, then of Glasgow, now in London, called *Chemical Recreations*, pages 151-2. In giving the blowpipe reactions, he says, "Any salt of strontia that dissolves in water acts in the same manner; the colour is not seen if the assay is not moistened with water, or if an insoluble salt is used."

Carbonate of strontium he directs to be moistened with hydrochloric acid, sulphate of strontia to be mixed with charcoal and grease, and thus reduced to sulphuret of strontia; these salts then give the crimson reaction. Again, he says, "The remarks on the influence of solubility and insolubility, and on the management of the carbonate and sulphate of strontia, apply exactly to the salts of lime." Then, on baryta, he says, "It shows scarcely any colour if not moistened, and its insoluble salts produce hardly a vestige of colour;" and concludes by observing, "The experiments prove that solubility in water is an important requisite for the production of coloured flames by salts of the earth."

These remarks in a popular work published ten years ago need no further comment, but commend themselves to the Doctor's perusal.

M.L.C.A.

juice of Atropa belladonna. The juice, after having been pressed from the plant, was put into casks and bunged down, with the view of keeping it for a few days, until its conversion into extract could be proceeded with. On opening the casks, the bungs were projected with considerable force, and the red fumes alluded to, resembling nitrous acid, issued from the casks. Some of the gas was collected in bottles, and was found to be soluble in water, and to redden litmus paper.

The Secretary acknowledged, on the part of the Society, Chaptal's *Elements of Chemistry*, in 3 vols., presented by Mr. Griffiths.

At the next meeting Dr. Brett will resume his lecture on Toxicology.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE COMMERCIAL VARIETIES OF GINGER.

BY JONATHAN PEREIRA, M.D., F.R.S.

(*Continued from page* 214).

2. *East Indian Gingers.*

This division includes four sorts of ginger, two from the Malabar coast and two from Bengal. They are more liable to be wormy than either West Indian or African ginger.

3. Malabar Ginger (*radix zingiberis Malabarici*).—Formerly one kind only of ginger was exported from this coast, namely, a coated or unscraped sort, which is sometimes called the "old sort of Malabar ginger," to distinguish it from the uncoated or scraped kind which of late years has been brought from this part of the world, under the name of "new sort of Malabar ginger." I shall distinguish them by the terms *coated* and *uncoated*.

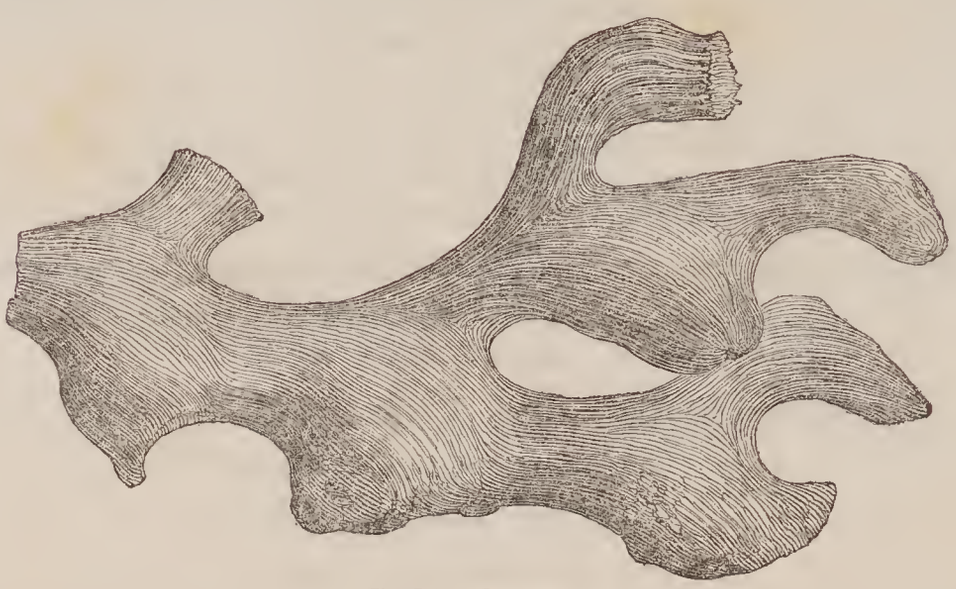
α Coated Malabar Ginger; *unscraped Malabar ginger; old sort of Malabar ginger; common Malabar ginger; Bombay ginger.* This sort is imported exclusively from Bombay. It comes over in bags and pockets. It is a coated sort, of a darker colour than the West Indian sorts, but paler than the common unscraped Bengal sort.

Coated Malabar Ginger.

In my samples, a portion of the coat (*epidermis*) has fallen or been rubbed off, and the exposed external portion of the body of the ginger is darker coloured than the remaining portion of the coat. When cut, the internal surface is found to be rather pale, though somewhat darker than that of Jamaica ginger. The races run small, and not much branched.

β Uncoated Malabar Ginger; *new sort of Malabar ginger; Tellicherry ginger; Calicut ginger; Cochin ginger.* This sort of ginger first appeared in the London market about the year 1841, having been imported by Messrs. Kensington, Payne, and Young. The quality being

exceedingly fine, it fetched from 75*s.* to 100*s.* per cwt., at the time when the old sort fetched only from 15*s.* to 20*s.* per cwt. Its races were large, bold, and very much branched.



Cochin Ginger.

When cut into, it was found to be quite soft, even down to the centre, the cut surface presenting a lemon tint. Its flavour was very aromatic. These qualities made it a great favourite with the trade, and, in consequence, it rose in value, and for a time fetched £6 or £7 per cwt. But being brought over in very large quantities, it soon declined considerably in price, and this produced carelessness on the part of the cultivators. Another circumstance which tended to reduce its value was the great havoc committed on it by the worm during the voyage, so that it frequently happened that, upon landing here, whole cases of ginger were converted into mere powder.

The first importation was from Baypore, near Calicut, on the Malabar coast; afterwards some came from Tellicherry, and subsequently large parcels of it have come from Cochin and Calicut, all on the same coast. The quality and flavour of the later importations have been for the most part much inferior to those of the first samples, and in general the prices have ranged from 42*s.* to 65*s.* per cwt. Recently, however, samples of an improved quality have been received which fetched from 65*s.* to 130*s.* per cwt.

This sort of Malabar ginger is imported in chests, casks, or bags. It is a scraped sort, and occurs in fine large branching races, having much of the character of Jamaica ginger, but having more of a brownish or reddish tint externally, and being very apt to be wormy. In flavour it resembles the Jamaica sort.

It is said to be grown at or near Calicut, and to be produced by the Jamaica plant transplanted to the Malabar coast; but how true this statement may be I know not.

4. Bengal Ginger *(radix zingiberis Bengalensis)*. Two kinds of ginger are brought to us from Bengal—the coated or old sort, and the uncoated or new sort.

a. Coated Bengal Ginger; *common Bengal ginger; old sort of Bengal ginger*. This is imported in bags. It is an unscraped dark-coloured ginger. The races are somewhat larger and plumper, and rather less liable to be wormy, than the coated Malabar ginger.

Coated Bengal Ginger.

The coat *(epidermis)* is greyish yellow, shrivelled and cracked down the face of the races, exposing the body of the root, which is much darker coloured (greyish black) than the coat itself; so that the races are remarkable for their bi-coloured character. To the cut it is more or less hard (*flinty* in the language of the dealers), and presents a darker colour than the other sorts. Of all the gingers now met with in commerce, it most deserves the name of *black ginger*. It is darker coloured than the coated Malabar ginger, and is otherwise so peculiar that dealers can never confound the two. Both sorts usually fetch about the same price.

β. Uncoated Bengal Ginger; *scraped Bengal ginger; new sort of Bengal ginger; Calicut sort of Bengal ginger.*—Soon after the uncoated or new sort of Malabar ginger came into the market, the Bengal growers, finding that they could obtain only from 15*s.* to 20*s.* per cwt. for ginger, while their Malabar competitors got from 75*s.* to 100*s.* per cwt., were aroused to compete with the latter. They accordingly, as I am informed, began to cultivate the new Malabar plant, or, as it was called, the Tellicherry sort. In consequence large quantities of this new Bengal sort were soon after received from Calcutta, and, being very large and bold in the race, captivated the buyers, who purchased freely at from £5 to £7 per cwt. But upon being brought into use it was found to be destitute of those intrinsically good qualities for which the new Malabar ginger was distinguished. It accordingly fell in price to 35*s.* or 40*s.* per cwt., and the original purchasers suffered a loss of at least 50 per cent. It is now scarcely met with.

Bengal Scraped Ginger.

This kind of ginger is imported in chests of 1½ cwt. It is a scraped sort, and is darker than Jamaica ginger. It is as plump as the new Malabar sort, but the races are not so large. To the cut it is more or less hard or flinty and dark. In its colour and hardness it resembles the common or coated Bengal sort; but in plumpness the uncoated Malabar sort.

3. *African Ginger.*

5. Sierra Leone Ginger.—All the African ginger which I have met with has been imported from Sierra Leone. It comes over in casks or bags.

African Ginger.

It is a coated or unscraped sort. The races are generally rather larger, but less plump, than those of the Barbados sort, which in other respects they resemble, and to which they are about equal in commercial value.

4. *China Ginger.*

Mr. F. Bassermann* has described a new sort of ginger from China. This is quite unknown in the English market; indeed I cannot find that any of even the most experienced dealers ever heard of China dried ginger.† As, however, the Chinese export preserved ginger, it is not improbable that they may occasionally have also exported dried ginger; but the former differential duties which existed in England would probably have prevented its introduction here.

Mr. Bassermann states that a cargo of 5000 chests was brought to Amsterdam in 1834 from Canton. The chests were small, containing each about 2½ lbs. Externally they were covered by a dark green paper with black ornaments and Chinese characters; and in addition to the name of the ship there was the following superscription: *Ngo-Nang-Gong, Extra Gember.* Internally, the chests were lined with fine paper, and under the lid there was a red leaf of paper with Chinese writing.

The ginger was large and broad, externally dark brown, and to the fracture dark, shining, and resinous. It did not break easily. The epidermis was very wrinkled and shrivelled. The odour and flavour were stronger than those of the best Bengal sort, and were almost equal to the West Indian kind. Its powder was darker than that of

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* *Pharmaceutisches Central Blatt* für 1835, p. 440.

† I have heard *Cochin ginger* called by mistake *Cochin-China ginger*, and for brevity *China ginger*.

either the West Indian or Bengal sorts, and contained some short fibres and dark shining foliaceous parts.

Washing and Bleaching.—The wholesale dealers sometimes wash ginger after its importation, and before it is offered for sale. I am informed that this operation is done with water only. In this state it is termed *washed ginger*. But much of the ginger which is imported is bleached before it is sold to the shopkeepers. This is done by washing it in a solution of chloride of lime and exposing it to the fumes of burning sulphur (*i. e.*, to sulphurous acid). *Bleached ginger* has a white chalky appearance (whence its name of *whitewashed ginger*), and occasionally a feeble odour somewhat like that of chlorine. Its appearance is supposed to be greatly improved by this bleaching process.

Commercial Assortment.—The wholesale dealers assort some kinds of ginger, according to their quality and commercial value; but sell other kinds unassorted.

a. Assorted Gingers.—The gingers which are assorted are the scraped or uncoated sorts, namely, Jamaica, scraped Malabar, and scraped Bengal ginger. These are assorted into several qualities, usually distinguished either by their price, or as first, second, third, and fourth qualities. Considered with respect to their characters, these assorted gingers may be arranged as follows:

1. Bold, soft, and bright.
2. Smaller, but soft and bright.
3. Flinty and dark.
4. Shrivelled, and only fit for grinding.

β. Unassorted Gingers.—The unscraped or coated sorts do not undergo any assortment, but are sold unassorted. This division includes four sorts, *viz.:*

5. African.
6. Barbados.
7. Common or unscraped Bengal.
8. Common or unscraped Malabar.

On the continent unassorted gingers are the kinds chiefly in use. Barbados and African are the best of these sorts. Unscraped Bengal ginger being generally plumper and sounder than unscraped Malabar, is generally preferred to the latter sort.

The following is a classification of ginger according to its commercial value, exclusive of duty, in September 1849, as bought of the importers in Mincing Lane:

£4 to £7 ℔ cwt.	£2 to £4.	30*s.* *to* 35*s.*	23*s.* to 25*s.*
(Used in England.)	(Used in England.)	(Used in England and on the Continent.)	(Used chiefly on the Continent.)
Jamaica	*New Bengal*	*Barbados.*	*Old Malabar*
New Malabar		*African*	*Old Bengal*

OZONE HYPOTHESIS OF CHOLERA.

If any practical refutation of this absurd hypothesis (of which we gave a notice in our last number) were required, it will be found in the returns of the Registrar-General for the week ending Saturday, 17th November, 1849. It there appears that during this week the deaths registered in the metropolitan districts were 284 less than on the weekly average of five previous autumns: the average being 1162,

the last week being only 874. Of this number eight cases were cholera, which is the exact number of deaths on the weekly average for the last five autumns. Yet with this favourable sanitary state of the metropolis, the Meteorological Report from the Royal Observatory, Greenwich, is that "*No electricity was shown during the week!*" There ought therefore to have been, on the ozone hypothesis, a complete absence of ozone, and an accumulation of *cholerific*, and other poisons in the atmosphere.

FUNGUS HYPOTHESIS OF CHOLERA.

In our last number (page 223) we gave a short sketch of the fungus hypothesis of cholera, and pointed out some of the errors, absurdities, and unwarrantable assumptions on which it had been hastily founded. Just as our number was going to press appeared Mr. Busk's announcement that the so-called cholera cells were derived from a species of *uredo* common in bread.

Since then, a very elaborate and interesting report on the microscopic bodies of cholera discharges has been published by the Cholera Committee of the Royal College of Physicians of London, the reporters being Drs. Baly and Gull.

From this report it appears, that after a most careful microscopic examination of water condensed from the atmosphere of infected localities, as well as of the drinking water of infected places, no bodies were found which could be regarded as identical with the more characteristic of those discovered by Messrs. Britton and Swayne in the rice-water discharges.

The reporters then submitted to careful examination the microscopic bodies found in the dejections of cholera. Mere inspection of the previously published figures of these would suggest strong doubts as to their representing identical bodies in different stages of development or decay; and the result has proved the propriety of these doubts. It has been found, that by the artificial digestion of cabbages, potatoes, and onions, rings are obtained not distinguishable from those published as cholera fungi; and it appears that Mr. Topping (a preparer of objects for the microscope) had pointed out that Mr. Britton's annular bodies were to be found in chalk mixture, of which, doubtless, most of the cholera patients had largely partaken. If our readers will take the trouble to turn over to p. 478 of vol. viii. of the *Pharmaceutical Journal* for April last, they will find figures of some Textulariæ and Rotaliæ found in chalk, and described in Dr. Pereira's paper on that substance, which would pass muster for the annular bodies of cholera.

The globular bodies of cholera dejections are nothing more than the spores of *Uredo* (*rust*, *smut*, and *bunt* of corn) found in almost every specimen of corn and bread.

The discs, with thick, elevated, and somewhat irregularly curved margins described by Messrs. Britton, Swayne, and Budd, differ from others in being more or less soluble in ether. Similar bodies may be artificially formed by compressing a piece of rich cheese between two plates of glass! Mr. Busk thinks that the smaller ones are altered starch grains, the larger ones altered contents of bran cells. At any rate it is certain that they are not fungi, and are not peculiar to cholera.

The large broken cells figured by Dr. Budd as cholera fungi undergoing decay, are probably parts of disintegrated vegetable tissue.

Altogether we regard this report as furnishing a complete refutation of the fungus hypothesis, and as being highly creditable to the industry and zeal of the reporters. We shall terminate this notice with the statements of the principal results and conclusions at which they have arrived:

"1. Bodies presenting the characteristic forms of the so-called cholera fungi are not to be detected in the air, and, as far as our experiments have gone, not in the drinking water of infected places.

"2. It is established, that, under the term 'annular bodies,' 'cholera cells,' or 'cholera fungi,' there have been confounded many objects of various and totally distinct natures.

"3. A large number of these have been traced to substances taken as food or medicine.

"4. The origin of others is still doubtful, but these are clearly not fungi.

"5. All the more remarkable forms are to be detected in the intestinal evacuations of persons labouring under diseases totally different in their nature from cholera.

"Lastly, we draw from these premises the general conclusion that the bodies found and described by Messrs. Britton and Swayne are not the cause of cholera, and have no exclusive connexion with that disease,—in other words, that the whole theory of the disease which has recently been propounded, is erroneous as far as it is based on the existence of the bodies in question."

ON THE CINCHONA BARKS.

BY M. WEDDELL.

If, says M. Weddell, whenever a specimen of cinchona bark came under our notice, we were acquainted with the principal points of its history, nothing would be easier than to assign to it the place it should occupy in a classification; indeed, it would naturally be placed by the side of the tree producing it. Unfortunately this knowledge is but rarely possessed, and for that reason it appeared necessary, in the first place, to seek in the barks themselves for the characters whereby to classify them, and to constitute them an independent group.

The division of the cinchona barks into the several varieties of *grey*, *yellow*, *orange*, *red*, and *white*, is well known. This classification is very defective, and has doubtless only been retained on account of the apparent simplicity in its application. Based on a characteristic such as colour, it possesses in a great degree the defects of artificial arrangements, without partaking of many of their advantages. Not only does it separate the products of the same tree, but it connects those which are essentially different. Formerly, it was thought that all the *grey* cinchonas were furnished by the same species, and many persons at the present time are of this opinion. But not only are they produced by many different species, but very frequently they are the young bark of the same trees, which yield the yellow and red cinchonas. A more useful, and indeed more natural, method of classification, would be one founded, in the first instance, on the chemical composition of the barks; it would then be only necessary to study their active principles, such as quinine, cinchonine, and tannin. But the results obtained by this method, although satisfactory in theory, would not by any means be so in practice, on account of the unavoidable difficulties arising from such a mode of classification, and also from the fact, now fully proved, that the same botanical species furnished barks varying greatly, according to accidental circumstances.

If, then, a classification be absolutely needed, one which should be based on the anatomical structure of the bark would be found to be of far greater utility than either of the preceding, inasmuch as we shall find existing, even in the cinchonas, a certain relation between the structural and chemical characters.

The following are the data which my researches on the subject have furnished me with :—

1. If a large piece of the *Cinchona Calisaya* met with in commerce be attentively examined, it will be found that the exterior surface is entirely deprived of its peridermis, and presents broad superficial furrows, short, more or less confluent,* and divided by projecting ridges, the bases of which are of a fibrous texture, similar to the inner surface of the bark or of the layer which is immediately in contact with the wood. The examination of a transverse section shows that the texture of this bark is homogeneous, and composed of ligneous fibres of almost equal thickness, uniformly distributed in the midst of cellular tissue gorged with resinous matter, tissue which may be said to isolate each fibre being interposed in thin layers between them. Finally, when these fibres are examined longitudinally, we find that they are short and fusiform, and that their cut extremities are but loosely attached to each other, and are sometimes completely separate, and appear to float in the midst of the cellular tissue which surrounds them.

2. If we take a similar piece of the bark of *Cinchona scrobiculata*, we shall find that instead of these furrows of fibrous texture, which so well characterize the *Cinchona Calisaya*, the exterior almost presents a smooth surface of a cellular texture, traversed here and there by slight linear indentations, the inner surface being, as in the preceding bark, of a fibrous texture. In the transverse section the fibres are more numerous than in the *Cinchona Calisaya*, especially towards the inner surface ; but they lessen in numbers rapidly near the exterior, and the outermost layer is entirely without them. These fibres, if examined in a longitudinal section, will be found to be of nearly double the length of those of the *Cinchona Calisaya*, and their extremities are invariably attached one to the other, their ends being by this means more elongated.

3. If we study with equal attention the bark of *Cinchona pubescens*, we shall there find a peculiar structure. The external surface somewhat resembles the preceding bark, with the exception of a slight whitish marbling, formed by the continuity of the peridermis, and scissures which may result from desiccation. The internal surface is fibrous, as in the preceding barks ; but a transverse section shows us that it is principally composed of cellular tissue, in which the fibres form but a small number of irregular and concentric series in the interior half of the bark ; and that which draws attention at the first glance is the size of these fibres, each

* These furrows are about the size of the fingers of the hand, and much resemble the impression which would be made if the tips of these members were drawn irregularly over a soft paste. These might be named the digital furrows. The Spaniards call them *conchas*, from the great similitude existing between the furrows on this species of bark, and those found in certain varieties of shells. They are more numerous, and of greater depth as the bark becomes older, and there occurs successive exfoliations of scales from the surface of the liber ; scales which ought to be considered as part of the liber itself, or more frequently, as it appears to me, as a partial reproduction of the cellular coat.

However this may be, after some little time, these layers of fibro-cellular tissue, in which the medullary rays do not penetrate, the circulation being, no doubt, insufficient, become enlarged, and thus add to the thickness of the peridermis.

one being three or four times as large as those of either of the former varieties ; the result being that several of them are attached and united together in bundles, which may be fully proved by the examination of a longitudinal section of this bark.

As may be perceived, we have only spoken of cinchonas which have been deprived of their peridermis, because it is in this state that they are now usually met with in commerce. If perchance they were again to be used with their natural coating, it would afford additional means whereby to distinguish them, but would not in any way affect those of which we have just treated; for nothing would be easier than to remove the peridermis and to expose the surface beneath. Be this as it may, the structure of all the *cinchona* barks more or less resemble one or other of the three types we have spoken of, and on this plan there might be formed, without much difficulty, a series of groups comprehending all the known cinchonas. The purpose, however, in noticing these peculiarities, has been to facilitate the comprehension of a very important fact in the diagnostics of the different kinds of cinchonas ; that of the vast difference they present in their mode of fracture. However singular it may, in the first instance, appear to be, it is easy to prove that, to a certain extent, the chemical composition of the bark operated upon may be determined by its mode of fracture ; or, more properly speaking, there exists a relation between the chemical and the anatomical characters of the cinchonas, this being constantly proved by a particular form of fracture : *smooth* or corky where it divides the tunic or cellular covering of the bark ; *fibrous*, *stringy*, or *woody* in those cases where it has affected one or other of the three forms of liber before described. Another fact which is now fully proved is, that the bark containing the largest proportion of quinine is that of the *Cinchona Calisaya ;* and experience has shown us, that after the *Cinchona Calisaya*, the barks possessing it in the greatest quantities are precisely those the structure of which most resembles this bark ; for instance, those in which the dermis is reduced to a single liber by the successive exfoliation of the outer tunics, or at least by their adjunction to the peridermis. On the other hand, experience seems to have shown, to a certain extent, that the grey cinchonas (which we have generally found to be the young barks of other species) contain a larger proportion of cinchonine than of quinine ; we also know that many old barks, which have retained the cellular coating they had when young, yield a proportionably larger quantity of cinchonine ; from which circumstance we may conclude that quinine is contained in the liber, or, more correctly speaking, in the cellular tissue interposed between the fibres of the liber,* and that the cinchonine is principally found in the tunic or cellular coating. As to the tannin, it is found in larger quantities in this latter part than in the fibrous tunic ; a fact which is easily determined with reference to the fresh bark where the exterior layers of the derm are more styptic than the internal layers.

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* It might appear from this, that the more abundant the cellular tissue is in the liber, the greater is the quantity of quinine contained therein ; but such is not the case. Indeed, when the cellular tissue intermixed among the cortical fibres is increased beyond a certain degree, as is the case in the *Cinchona pubescens*, the liber then seems to assimilate to the cellular tunic, both in its properties and in its anatomical structure. The reverse of this proposition is, on the contrary, perfectly true, that is to say, the greater the number of fibres in the liber, the closer they are, and consequently the less mixed with the cellular tissue, as in *Cinchona scrobiculata* and *Cinchona amygdalifolia*, in which cases there is also less quinine found. The density of the fibres themselves is such that we cannot suppose them to contain any notable quantity of the precious alkaloid.

Thus, the more the surface of a transverse fracture of a cinchona presents a corky character, the more cinchonine we may presume it contains; when, on the contrary, it presents a fibrous character, we may expect to find in it a larger proportion of quinine.

In other terms, it is more than probable that a cinchona will afford a good product. 1st, If it presents much conformity in the texture of the different layers of its derm; 2dly, If the relation of the fibrous and cellulo-resinous elements of the liber are equal; and 3dly, If the fibres composing this latter layer are short and independent of one another, either laterally or longitudinally.

ON TWO BALSAM TREES (*Balsamodendra*) FROM SCINDE.

BY J. ELLERTON STOCKS, M.D., F.L.S.,
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THE MUKUL OR GOOGUL TREE.

The gum-resin *Googul* has had its synonyms traced out by Sprengel in *Hist. Rei Herbariæ*, i., 272; followed by Ainslie in *Materia Indica*, i., 29; and Royle in *Illustr. Botany Himal. Mount.*, p. 176. It is the *Mukul* of the Persians and Arabians, and the *Bdellium* (βδελλιον) of Dioscorides and (?) Genesis ii., 12; Numbers xi., 7.

There has always been, however, some degree of uncertainty about the tree from which it is obtained.

It is unnecessary here to dwell on the idea of Kæmpfer (*Amœnitates*, p. 668) that it is produced by the *Borassus flabelliformis*, or of Matthiolus, that it comes from the *Chamærops humilis*. Moreover, it has no connexion with the Googul of the Coromandel Coast, which is the Koonder gum from the *Boswellia glabria*, Ainslie i., 136.

Virey, *Hist. Nat. des Médicamens*, p. 291, first suggested that Bdellium came from an *Amyris*, the *Niotoutt* of Adanson, Voy. 162, *Heudelotia Africana*, of Flora Senegambiæ, i., 150, *Balsamodendron Africanum*, Arnott in *Annals Nat. Hist.*, iii., 87. It is probable, indeed, that African *Bdellium* is yielded by this shrub, which is closely allied to the *Googul* tree of Sylhet and Assam, which Dr. Roxburgh had growing in the Calcutta Garden, and described in the *Flora Indica*, ii., 244, under the name of *Amyris commiphora*, with the Sanscrit synonym of *Googula*; but he was not aware of its yielding a bazaar-gum. In the *Hortus Bengalensis* this same plant appears as the *Amyris agallocha*, which was probably the name finally adopted by Roxburgh, from some suspicion of the distinctness of Jacquin's plant (*Commiphora Madagascariensis*, Jacq. *Hort. Schoenbr.*, ii., p. 66 et 249), the supposed identity of which had suggested the specific name in the *Flora Indica*. The alteration, however, had not been entered in the MS. of the *Flora Indica*, when death deprived India of its most methodical and accurate botanist. Royle grew this plant in the Saharunpore Garden, and was informed that it produced the googul gum-resin, but recommends (*Him. Botany*, and more recently in his work on Materia Medica, Lond. 1847) that the subject should be followed up by those who have the opportunity of examining the flowers and collecting the gum.

The tree now under consideration is abundant on rocky ground in Scinde, about Kurrachee, Garrah, Tattah, Jerrok, &c.; in short, wherever the limestone formation extends. It is, therefore, most probably, very common in Beloochistan and up the Persian Gulf, and is one of the plants connecting the Syrian and Indian Floras.

1. Balsamodendron *Mukul* (Hook); spinescens; partibus novellis cum calyce pube capitatâ deciduâ sparsis, foliis *vel* simplicibus obovatis anticè serrato-dentatis *vel* trifoliatis foliolo medio sæpissimè rhomboideo-ovali cum foliolis lateralibus conformibus dimidio minoribus undulatè obliquo

inciso-serrato, calyce campanulato, petalis ligulatis apice reflexis, staminibus oppositipetalis disci inæquidentati profundioribus recessubus sitis, carpellis (quotquot sint) perfectis, fructûs ovoideoacuminati ad basin calyce fisso emarcido stipati valvulis epicarpialibus integris mesocarpiique cyathiformis margine 4-lobati lobis pyrenarum verticem acuminatam attingentibus. Balsamodendron Roxburghii, Stocks in *Bombay Trans.*, 1847 (exl. syn.).

Balsamodendron Mukul.

Fig. 1. Flowering branch
2. Section of male flower
3. Section of female flower
4. Fruit
5. Section of fruit with two carpels
6. Section of fruit with three carpels

Descr.—A small tree four to six feet high, or more generally a stunted bush, with thick branches spreading on all sides. In barren and rocky situations the gnarled limbs stretch from the crown along the surface of the rock. Branches knotty and crooked, with the ash-coloured bark peeling off in flakes, leaving exposed the under-bark which separates in large rolls, much resembling those of *Betula Rhojputia;* the subterminal branches short and spiniform, with buds and secondary spines on them. Leaves and flowers collected at the end of short stunted buds, which finally develop into spines, or become young soft shoots, on which the leaves are arranged alternately.

Leaves smooth and shining, obovate, almost sessile, shallowly toothed anteriorly, the tapering base entire; in thriving plants and luxuriant shoots inciso-serrate, cuneate-obovate, rhomboid or oval-acute, with a longer stalk from whose summit spring one, or more generally two, lateral leaflets, which are sometimes minute and entire, but generally serrated, half the size of the terminal leaflet, and overlapping it in its induplicate vernation.

Young leaves, while in the bud, covered with glandular hairs which soon drop off, a few only remaining in the axil and on the petiole. Flowers minute, in little bundles at the ends of the non-developed buds, with or without leaves, subsessile, with three minute bracts to each

flower; imperfectly unisexual, diœcious. MALES, with ovary small and barren; FEMALES, with short stamens and small imperfect anthers.

Calyx cylindrical, 4—5-toothed, thickly covered externally (as are the bracts) with glandular hairs; tube splitting as the fruit developes, and remaining spread out and withered at its base. Corolla of four, rarely five, strap-shaped, brownish-red petals; margins slightly overlapping in æstivation, with an inflexed mucro; tips of the petals curled back. Stamens 8—10, the four opposite the petals shorter than the others. Disk 8—10-toothed, the alternate sinuses deeper, and in these are situate the short stamens. Ovary bisulcate, two-celled, rarely three-celled, and still more uncommonly four-celled. There is no relation between the quinary proportion of the perianth and this increased number of the carpellary leaves. Ovary tapering upwards and passing imperceptibly into the short and thick style. Stigma obscurely two-lobed. Ovules two in each cell, collateral, suspended. Drupe red when ripe, ovate-acuminated, often bluntly angular, marked by two sutures along which the epicarp and a portion of the mesocarp fall from the base in two fleshy valves, whose position is that of the carpellary leaves, leaving the nut enveloped by a four-cleft yellow pulp, whose arms meet at the apex. Nut ovate-acute, readily splitting into two. Each half has a groove on the commissural plane, bifurcating upwards. Into this groove fits a prolongation of the axis. The drupe has sometimes three sutures and a six-cleft pulp; and rarely four sutures, four nuts, and an 8-cleft pulp. Out of a parcel of fifty-six, two had three sutures and one had four sutures, the rest being normal.

Seeds generally one in each cell, or $\frac{1}{1}$ (two ovules being abortive), often $\frac{0}{1}$ (three abortive), more rarely $\frac{2}{1}$ (one abortive), still more rarely $\frac{2}{0}$ (two abortive), and very seldom $\frac{2}{2}$ (all perfect). Albumen none; embryo straight; radicle superior; cotyledons thin, intricately crumpled and plaited.

OBS. 1.—This shrub is called *Googul* or *Guggur*, by the Hill-Belooches, who indeed do not know it by the name of *Mukul*. It yields the gum-resin googul, which they collect and bring to the bazaars of Hydrabad and Kurrachee, where it sells at the rate of two rupees the maund of 80lbs. At Bombay, its tariff valuation is two rupees the maund. It is collected in the cold season by making incisions with a knife in the tree, and letting the resin fall on the ground. Hence the dirty and impure state in which it is found in the shops. I have obtained it from September to February, and have found it exude in large tears from a clean incision, of the colour, consistence, and opacity of *pus laudabile*. My informants say that from half to a whole seer is yielded by a single tree. It is esteemed cordial and stimulant. It hardens and turns brownish-black very slowly.

Made up into a cake with bajree flour, it is commonly given to horses and cattle when they have a cold. The dealers from Cabool have a custom of administering it to their horses in the cold season, thinking that it keeps them in health and condition. The fruit and young shoots are applied to a similar purpose. The gum is made into a plaster and used to discuss tumours and boils, and is regarded as efficacious in expelling the guinea-worm, both taken internally and applied to the tumour. It is extensively employed by the Hindoos as incense for burning in their temples, although its smell is by no means agreeable. It is also much prized by builders, who mix it with the mortar and plaster used in the construction of houses of a somewhat superior description, where durability is an object. The googul is boiled in water for a considerable time, when its spirit (as they phrase it) is communicated to the water, and the dregs are thrown away. This solution of the gummy part, which, according to Newman's analysis, should be six drachms, two scruples in

every ounce, is mixed with the lime, and employed with confidence to make the plaster adhere strongly, and to prevent it from crumbling and splitting. The googul water is sometimes washed over the walls by itself.

The works on Materia Medica by Ainslie, Royle, Pereira, Lindley, O'Shaugnessy, Guibourt, &c., may be referred to for additional particulars; and besides these *Bdellium*, *Googul*, or *Indian Myrrh*, is noticed in—

1. Ulfaz Udwiyeh, No. 864. *Khuzlaf*, A; n. 968. *Durukht*, P. *Dowm*, A; (the tree), n. 1383. *Mukul*, A P; n. 222. *Aflatoon* (Plato!) *Googul*, H; n. 408. *Budliyoon* (Bdellium!) (the Gum).

2. Taleef Shereef, No. 809 *Googul*, n. 944. *Mukul.*

3. Forskahl, *Materia Medica Kahirina*, p. 158. "*Bdellium. Sumugh Mukul Azruk* (meaning Mukul gum of a colour like bluish-grey eyes,—glaucopsoia) est Myrrha imperfecta."

4. Arrian; *Expeditio Alexandri*, lib. vi., cap. xxii., καὶ ἐν τῇ ἐρήμῳ ταύτῃ, λέγει Ἀριστόβουλος, κ. τ. λ., being the first of the four plants mentioned by him as growing in the Desert of the Gadroü (Beloochistan towards Mekran); the other three being (in the order he gives them) 2. *Jasonia*—nova species—"*I., glutinosæ* affinis, sed foliis inciso-serratis distinctissima:" *cel: et amiciss: Hooker in litt.* 3. *Rhizophora mucronata*, *Ceriops Candolleana*, *Brugui Rheedii*, and *Avicennia tomentosa* (as to the general features), and *Ægiceras fragrans* (as to the flower). 4. *Euphorbia neriifolia.* I reserve the proofs of these statements for a future communication.

5. Makhzan-el-Adwiyeh. For the following translation of a portion of the article "*Mukul*," in the *Makhzan-el-Adwiyeh* (Magazine of Medicines) of Mohammed Hosayn Khan (from the Persian of the Calcutta quarto edition), I am indebted to Lieut. Burton, of the Scinde Survey, than whom no one is more competent to overcome the difficulties of a corrupted text and an obscure author:—

"*Mukl.* In Puryàni (*Syriac*) *Muklà*, in Rumi (*Greek*) *Budliyún*, in Arabic *Kafr* (bitumen or pitch,—called also *Kafr ul Yahud*, or *Jew's Pitch*), and *Kawar*, in Persian *Búí Tahúdan* (the Jew's perfume—because that people use it in fumigation), in Hindustani *Gúgal.*

"It is the gum of a large tree about the size of the *Kundur* (olibanum), growing plentifully upon the shores of the sea of Umán (the sea on the east coast of Arabia), and in Sanjar (Khorasan?) and India. Its general characteristic is bitterness, and it is of many kinds, as *e.g.*, 1st, the *Mukl-i-arzak* (bluish Bdellium), in colour reddish and bitter; 2nd, *Mukl el Yahúd* (Jew's Bdellium), of a yellowish tinge; 3rd, *Mukl-i-Sakalbi*, which is clouded, impure, black, and soft; 4th, *Mukl-i-Arabia* (Arabian Bdellium), which grows in Yemen, and is of the colour of the *Badanjan* (ripe fruit of the egg-plant, *i. e.*, greenish-black.) The best kind is clear, pure, and brilliant, viscous, adhesive, soft, sweet-smelling, yellow, and bitterish. When thrown upon the fire it emits an odour like the laurel, and readily dissolves in water. It must be unmixed with wood, straws, sand, earth, or such matters. Its properties last for twenty years. When old its bitterness increases; and the older it is the darker it becomes, exchanging its softness for dryness and hardness, especially the Arabic, as they mix it with myrrh."

My friend Assistant-Surgeon Carter showed me fine specimens of the *Mukul* gum collected by him on the southern coast of Arabia, together with numerous other gums, all accompanied by admirable drawings of the trees producing them. There is, therefore, some error in the statement of Dr. Malcolmson (Royle's *Materia Medica*) that Bdellium is not produced in Arabia.

Moreover, the *Mukul*, and the tree producing it, are, from Dr. Carter's specimens, identical with the Scinde *Googul* and its tree, as might be expected, from the great similarity between the vegetation of the rocky

part of Scinde and that of Arabia. The range of our *Googul* tree is therefore—Arabia (*Dr. Carter*) ; and, according to my own observations, in rocky ground throughout Scinde, at Deesa in Marwar, and lately in Beloochistan Proper. It flowers in March and April, and the leaves and young shoots appear in April and May. In sheltered situations, as under the bank of a water-course, it may be found in fruit, flower, and leaf, for the greater part of the year.

THE BAYEE BALSAM TREE.

2. Balsamodendron *pubescens;* inerme ; partibus novellis pube detergibili subfurfurosis, foliis bi-tri-jugis cum impari foliolis integris medio obovato lateralibus sæpissimè oblongo-obovatis, calyce urceolato-campanulato, petalis obovato-acutis apice patentibus, staminibus æquilongis disci æquidentati sinubus sitis, ovarii bicarpellaris loculo altero penitùs abortivo, fructus globoso-acuti ad basin calyce integro emarcido stipati valvulis à basi semibifidis mesocarpiique cyathiformis margine 4 dentati dentibus pyrenarum verticem obtusam haud attingentibus. B. pubescens, Stocks in *Bombay Trans.*, 1847.

Balsamodendron pubescens.

Fig. 1. Section of Female flower
2. Section of Male flower
3. Fruit-bearing branch
4. Section of fruit with two carpels
5. Section of fruit with three carpels

Descr. A small tree, or stunted shrub, much resembling the Googul tree, but the sub-terminal branches, though abrupt, are not spiniform. Bark peeling off in flakes. Leaves ternate, fascicled at the end of the stunted buds, but on the young soft shoots alternate, with an additional distant pair of leaflets; long-petioled, soft and downy (as are the young shoots) with short furfuraceous pubescence. Leaflets obovate, entire, often retuse; the terminal one stalked, the lateral ones subsessile, often somewhat rounded. Flowers sessile in bundles at the end of the stunted buds, unisexual and diœcious as in the Googul. Calyx-tube shallow, contracted at the mouth. Petals red or white, with æstivation as in the Googul, spreading but not reflexed at the apex in anthesis. Stamens equal in height. Disk equally toothed. Ovary as in the Googul. Drupe red, globose with a short point, marked by four conspicuous white sutures, the alternate ones (corresponding to the mid-rib of the carpellary leaves) not reaching to the apex of the fruit. Valves two, each cleft half-way up to the secondary or false suture. Pulp orange-coloured, four-toothed upwards, not reaching to the apex of the nut, which is left naked. Nut

ovate, obtuse; one of the halves into which it splits is a mere flat plate or scale, the other is a perfect cell grooved on the commissural plane. Sometimes the number of carpellary leaves is increased. Thus out of a parcel of 120 there were four, and out of a parcel of 200 there were seven, which had six sutures and a pulp six-toothed towards the top. In these cases the additional carpel was represented by a second flat plate, or more rarely there were two perfect cells and one abortive. One seed in each perfect carpel. Albumen none; embryo straight. Radicle superior; cotyledons crumpled and plaited.

This shrub is called *Bayee* by the Hill-Belooches, who make no use of it. Its young shoots and buds are remarkably fragrant when bruised. In the cold season it yields a small quantity of a tasteless, inodorous, brittle gum, almost entirely soluble in water. It flowers in March and April, and its leaves and young shoots appear in April and May. It is a native of Beloochistan and the hills which separate that province from Scinde; probably also of Afghanistan, attaining its southern limit about Kurrachee.

Dr. Arnott hints at two sections of *Balsamodendron*, depending on the relative depth of the calyx. The Googul has its calyx long and tubular. The one just described has its calyx shallow, and this is especially observable in a section of the flower. Moreover, its fruit differs in having two additional imperfect sutures, in which it agrees with *B. Gileadense* and *B. Kaful*, as we gather from Forskal, and with *B. Berryi* and *Wighiti*, as Dr. Wight kindly informs me.—*Sir W. J. Hooker's Journal.*

ON THE VANILLA OF THE ISLAND OF BOURBON.

BY M. BOUCHARDAT.

The greater portion of the vanilla we receive comes from the maritime countries of Mexico; it also grows on the banks of creeks shaded by the mangoes, which are sometimes under water at high tide; also in Columbia, and in Guiana. Attempts have been made to cultivate it at Cayenne, St. Domingo, and the Isle of France. These efforts have also been followed in the Island of Bourbon. M. Menier has lately received two boxes of vanilla from this colony, and has forwarded a specimen of it to me, which gave rise to the following investigations on the subject.

The *vanilla of the Island of Bourbon* is certainly produced by the same plant as that of Mexico; the husks present the same general characters; they are from six to seven inches long, shrivelled, furrowed longitudinally, narrowest at the two extremities, and bent at the base. These husks are rather soft, viscous, of a reddish brown colour; they possess in a considerable degree the characteristic odour of vanilla; they readily become covered with the white crystalline efflorescence.

The vanilla of Bourbon only differs from that of Mexico in the following unimportant characters: it is generally less plump, from one-third to two-thirds of an inch shorter, and rather thinner. Its colour is redder, and not so brown; it is drier and less unctuous. Above all, it is distinguished by the character of the extremities, which dry up and contract, losing that flexibility so characteristic in the Mexican variety. These differences, which are very trifling, suffice to render the vanilla of Bourbon less valuable in a commercial point of view. I am of opinion that these differences arise partially from the mode of preparation or preservation of them; for instance, in the manner of drying the husks, and in the coating of them with oil. In general utility the vanilla of Bourbon is scarcely inferior to the best vanillas met with in commerce.

It has been long since stated, that on account of the high price of vanilla, its culture was worthy of attention. I shall presently show that the purposes to which this delightful aromatic may be applied are more important than is generally imagined. But the difficulties in its cultiva-

tion seem to be great, for in the different countries it has, as yet, not extended beyond experiments.

M. Morren has, nevertheless, in the greenhouses at Liege, cultivated some vanilla with success. He states that the plants he possesses have yielded vanilla to the value of 600 francs in one year. A single plant, about three yards high, cultivated in the greenhouse of the Museum in Paris, yielded, in 1840, 117 pods of vanilla, having a sweet odour, and ripening in about a twelvemonth.

The following are the principal difficulties relating to the cultivation of vanilla:—1. The proper choice of the species or best variety; 2. The necessity of having an elevated temperature; 3. The determination as to the most favourable conditions for the development of this plant; 4. A good mode of preparing the pods.

The species or variety producing the best commercial vanilla is not yet determined. The *Vanilla aromatica* of Swartz, figured by Plummier, and ascribed by Linnæus to the *Epidendrum vanilla*, does not appear to be the vanilla of commerce. Indeed, Plummier states that his plant, which is from St. Domingo, is without odour, the fruit small, thin, and cylindrical; thus does not resemble the true vanilla. On the other hand, MM. Splitgerber and Morren assert that the long vanilla of commerce is furnished by the *Vanilla planifolia*. That which makes the latter appear to be the most probable opinion is, that the same species, cultivated in the houses of Liege and Paris, *artificially produced by the pollen of another species*, has produced pods equal to those of the best commercial vanilla. Thus we see it has yet to be determined which is the best species or variety to cultivate.

The cultivation of vanilla in France must, necessarily, be limited, on account of its requiring an elevated temperature, such as that of a greenhouse, which ought to be of a large size and airy. From this cause its cultivation is not likely to be attended with any profitable pecuniary results, unless under peculiar circumstances. The most favourable conditions for the development and fructification of the vanilla are far from being determined. The difficulties attendant on the cultivation of the orchidacea are well known, and that of the vanilla appears to be more so than others of the same family. Its stems are provided with adventitious roots, which implant themselves in the bark of the mangoes, and it is periodically watered by the high tides. Does not the vanilla require this or a similar tree favourable to parasitic growth? And are not the salts of the sea equally favourable to the development of the mangoes, and consequently to the vanilla itself?

In the Island of Bourbon, and in Guiana, the principal requisites we have named may be obtained. I think, therefore, the cultivation of vanilla would be regular and certain, and the increased consumption of it would speedily follow its production.

I will now refer to the question of increased consumption. I perfectly agree in the opinion of MM. Mérat et de Lens, who say (*Dictionnaire de Matière Médicale*, t. 6, p. 852, that "the vanilla, if used in many of our aliments, would give to them an agreeable and delicate flavour, rendering them more serviceable in derangements of the digestive functions." It may also be added that vanilla contains a balsamic oil, possessing the valuable properties (which M. Deschamps has discovered in the poplar and in benzoin) of counteracting the rancidity in fatty bodies. We may thus easily understand the twofold utility of vanilla in the manufacture of chocolate. In taking into consideration the delicious flavour of this aromatic, we see to what great extent it might be used in the preparation of fatty aliments, if its price was moderate and certain. The sweetness of its perfume is a great recommendation to its employment by Chemists, for the purpose of counteracting the rancidity of pomades.—*Journal de Pharmacie.*

ON VESSELS COATED WITH A VITRIFIED ENAMEL, FOR USE IN LABORATORIES, &c.

BY M. CHEVALLIER.

Among the articles which came under our notice at the last Paris Exposition, the vessels coated with enamel, called non-oxidizable iron, deserve especial notice. They are manufactured by M. Paris, No. 111, Rue de Bercy, at Bercy, near Paris. These vessels, which do not oxidise, and which resist the action of fire, acids, and alkalis, may be employed by the Pharmaceutical Chemist with much benefit for the following purposes:—1st, For the preparation of pharmaceutical products; 2ndly, For the construction of pipes, which, when fixed in stoves and laboratories, would not be affected by acid and aqueous vapours.

The enamelled iron of M. Paris may be used in the manufacture of all chemical products, in dye-houses, soap-manufactories, and indeed in all cases where the instruments used are exposed to oxidising agencies.

The enamel with which the metal is coated possesses the properties of glass, which, as is known, is almost unacted on by most chemical agents. —*Journal de Chémie Medicale.*

[The enamel above referred to differs essentially from that with which iron vessels have been coated in this country for several years past.—Ed. Ph. J.]

ARSENIC EMPLOYED MEDICINALLY BY THE CHINESE.

Extract from the "Report of the Chinese Hospital at Shanghae, from July 1st, 1847, to December 31st, 1848," printed at Shanghae, 1849.

"In the accounts of ague and its treatment by Chinese writers on medicine, little has been found of much interest. The descriptions of this disease are particularly meagre and unsatisfactory. But there was one prescription found, which shows that the Chinese are acquainted with the power of arsenic in checking the periodicity or return of ague. The prescripton was obtained from a teacher, who said it formed one of a series of prescriptions which had been kept for some time in his family; and the subject is one of so much importance, that the whole of the prescription is here given entire.

[Here follows the prescription in Chinese characters.]

TRANSLATION.

Prescription to stop the Tertian or greater Ague.

"'Take one dried orange; orpiment, or sulphuret of arsenic, three drachms.* Scoop out the inside of the orange; introduce the arsenic into it, and over a slow fire, let them be roasted to ashes, preserving the essence of both; then reduce the whole to powder; and of this, let each dose be three drachms, taken with old or mellow wine.'

"According to this mode of preparation, the dose of arsenic must be very uncertain; for as the sulphuret is volatile, a large portion of it will pass off; but some of the metal, in the form of oxide, will remain among the ashes of the orange, quite sufficient for a powerful dose.

"The interesting part of the prescription is, that the Chinese should have discovered the use of arsenic for ague. This is perhaps the most certain remedy for this disease when carefully used; and in the form of Fowler's solution of arsenic, *Liquor arsenicalis* of the Pharmacopœia, proves most efficacious in breaking up the periodicity of intermittent fevers; and though, according to the above prescription, the dose must be very uncertain, the mere circumstance that the medicine is so used by the natives of this country, is one that may induce observers to institute fur-

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* The *tsëen* or mace [translated drachm] here spoken of, is the tenth part of a tael, and as the latter weighs 600 grains, the mace is exactly equivalent to a drachm of troy weight.

ther researches into the native medical works, by which means further analogies of treatment may be found, It may be mentioned here, that in cases of sloughy ulcers, the Chinese use chloride of mercury, or calomel ointment, to cleanse the ulcer, and produce a free purulent discharge."

COMPOSITION OF MARBLE.

BY WITTSTEIN.

Former analysists have stated that Carrara marble, like Iceland-spar, was pure carbonate of lime, and consisted merely of lime and carbonic acid. Wittstein, however, found this to be an error. He examined three sorts of marble and obtained the following results :—

Composition in 100 Parts.	Carrara Marble.	Crystalline Marble of Schlanders in the Tyrol.	Massive Marble of Schlanders in the Tyrol.
Carbonate of lime	99.236	99.010	97.040
Carbonate of magnesia	0.284	0.521	2.109
Protoxide of iron, peroxide of iron, and phosphoric acid	0.251	0.062	0.360
Silica.....	.....	.....	traces
	99.771	99.593	99.509

Buchner's *Repertorium*, 3tte Reihe, Bd. iii., Heft. 1.

COMPOSITION OF CHALK.

BY WITTSTEIN.

[The composition of the white chalk of the southern part of England has been given in a former volume of this Journal (*Pharmaceutical Journal*, vol. viii., pp. 413 and 478).]

Lampadius states that when chalk is heated to redness it gives out a mixture of carbonic acid and carbonic oxide gases ; and Hermbstadt always obtained some ammonia and carburetted hydrogen in the coloured products. As no ammonia was originally contained in the chalk, its production is ascribable to the decomposition of animal matter.

Chalk, like marble and Iceland-spar, is anhydrous carbonate of lime ; but it is distinguished from both of these substances by being amorphous. Its impurities are, besides organic substances, magnesia, alumina, protoxide of iron, sesquioxide of iron, protoxide of manganese, sulphuric acid, and phosphoric acid.

Wittstein found its composition to be as follows :—

Carbonate of lime	97.686
Carbonate of magnesia	0.468
Silica	1.100
Alumina, protoxide of iron, sesquioxide of iron, protoxide of manganese, sulphuric acid, and phosphoric acid	0.550
Organic matter	0.130
	99.934

Buchner's *Repertorium*, 3tte Reihe, Bd. iii, Heft 2.

THE ADULTERATION OF DRUGS AND CHEMICALS.

THE DILUTION OF ETHER.

BY MR. H. D. POCHIN.

I have recently had my attention directed to the exceedingly impure state in which the ether of commerce is frequently met with, and think the results may not be uninteresting to some of your readers at a time

when, through the exertions of the Pharmaceutical Society, the adulterations of drugs and chemicals are attracting notice.

Of six samples of ether, obtained from different sources, which I have examined, the following are the proportions of water and spirit in each, which were the only impurities of importance:—

No. 1.	72	parts	water	and	spirit	28	parts ether.
No. 2.	2	"		"		98	"
No. 3.	60	"		"		40	"
No. 4.	...	...	...	...		100	"
No. 5.	32	"		"		68	"
No. 6.	...	...	...	...		100	"

The sample No. 1 was obtained from a noted *cheap* house: the other samples were from houses of character.

The method adopted in the examination was the following simple one:—A tube graduated into 100 equal parts was filled through, fifty parts with a concentrated solution of chloride of Calcium, and twenty-five parts of the ether for examination then added. After brisk agitation for a few seconds the liquids were allowed to separate, and the amount abstracted by the solution of chloride calcium at once read of.

69, *Market Street, Manchester. Nov.* 3, 1849.

TRAIN-OIL CAPSULES.

In a recent number of the *Lancet* we are told that "a correspondent, who signs himself 'F.,' complains of the falsification of capsules by a Druggist, which, professedly containing copaiba, were found, on examination, to consist only of a pellicle enclosing *train-oil!*" Judging by the price at which capsules are sold by the gross filled ready for use, we are not at all surprised at the above falsification. It is not improbable that the Druggist was ignorant of the fact; but we notice it to show the necessity of caution in the purchase of capsules when offered wholesale at a rate which would scarcely cover the cost, even if filled with train-oil instead of the genuine drug.

SPURIOUS FERRI CITRAS C QUINA.
BY MR. J. B. BARNES.

I beg to caution your readers against purchasing a *spurious article* now in the market, selling under the name of Ferri Citras c Quina. I have analysed two specimens of this article obtained from different sources, and find that they *do not* contain a trace of *Quinine.*

There is a great similarity in the appearance and behaviour of these two specimens; they are in thin scales of a yellowish green colour, have a bitter taste, are very soluble, and have a strong acid reaction. A *qualitative* examination gave me the following results:—

Specimen No. I.

Sesquioxide of Iron
Citric Acid
Yellow bitter extractive matter.

Specimen No. 2.

Sesquioxide of Iron
Citric Acid
Sulphuric Acid
Yellow bitter extractive matter.

The quality of each specimen at my disposal was too small to allow of a further examination of the extractive matter.

I would add, for the information of those who are not conversant with *Analytical Chemistry*, that the readiest method of ascertaining

whether their Ferri Citras c Quina really contains Quinine, is to make a solution of it in water, and add *ammonia*, which throws down the Quina, leaving the iron in solution in consequence of the presence of an organic acid.

1, *Brook Street, Paddington, Nov.* 20, 1849.

This communication is worthy of attention. The variation in the composition of the preparation alluded to is a subject of frequent complaint, each maker preparing it according to his own formula and proportions, which are arbitrary. A former article by Mr. Barnes has called forth the following reply :—

THE ADULTERATION OF WHITE PRECIPITATE.

To the Editor of the Pharmaceutical Journal.

Sir,—In your last number of the Journal is a communication from Mr. Barnes, of Paddington, which, as a country druggist, I cannot allow to pass unnoticed. Mr. Barnes' statement is to the effect that a London wholesale-house keeps a white precipitate reduced fifty per cent. for their country customers, who will not pay them a full price for a genuine preparation. One would naturally suppose that if their country customers would not afford a fair price for one genuine article, they would not for another, and that therefore the stock of a country druggist must be a very deteriorated affair when taken into comparison with that of their metropolitan brethren ; an impression which, if allowed to get into general circulation, must tend to have a very baneful effect, equally upon their characters as upon their trade. As far as my experience has led me, I affirm that the stock of a country druggist is quite equal to that of any druggist in London, and in many instances higher prices are obtained for it than can be procured in London—the fluctuations of the market not reaching the country so soon; and I believe that any London wholesale house who would stoop to adulterate white precipitate fifty per cent., would feel as little compunction in selling it to a Bond Street or Cheapside druggist, as they would to one of Kent or Sussex, provided they felt the deception would not be detected.

I am, Sir, your obedient servant,

Tenterden, Kent, Nov. 21, 1849. Thomas Bolton.

Mr. Bolton appears to have overlooked the fact that Mr. Barnes does not say a word about Country Druggists. His words are "Country customers who will not pay the price of the genuine article." We presume he alludes to country grocers, oilmen, and general dealers. If there be any country Druggists who come under the definition—that is, who will not pay a fair price for a genuine preparation—then to such parties the statement of Mr. Barnes is applicable, but to no others. In our number for October allusion is made to "grocer's cream of tartar" which is sold in America, and is adulterated to about the same extent as the article which we may, by way of distinction, call "grocer's white precipitate."

INKS FOR WRITING ON TIN-PLATE AND SHEET ZINC.

Bossin gives the following directions for preparing an ink for writing on tin-plates:—Dissolve one part of copper in ten parts of nitric acid, and add to the solution ten parts of water.

Mr. Redwood, in Gray's *Supplement*, gives the following formula for *horticultural ink*, for writing on zinc labels for gardens:—Chloride of platinum, ℥v. ; distilled water, f℥j; dissolve. Writing made on zinc with this solution almost immediately turns black, and cannot be removed by washing.

ANIMALCULES FOUND IN WATER.

Mr. Highway, of Walsall, having had some water sent for examination by the Board of Guardians, found in it carbonate of lime, with minute traces of oxide of iron. He also detected by the microscope swarms of animalcules, of which he has sent us sketches in pen and ink, desiring to know their names.

The animalcules figured by our correspondent are common inhabitants of stagnant fresh waters. Three of them are *Monoculi* (one a species of *Daphnia*, perhaps *D. pulex;* and the two others species of *Cyclops*, of which one may be *C. castor*, the other *C. quadricornis*), and three are *globe animalcules* (species of *Volvox*). The monoculi are figured in Jurine's *Histoire des Monocles*, published in 1820 : and the globe animalcules in Ehrenberg's work on the infusory animals, as also in Pritchard's *History of Infusoria.* The figures sent by our correspondent are too imperfect to enable a naturalist to determine with certainty the species which they are intended to represent.

ORGANIC MATTER IN WATER.

BY PROF. FORCHHAMMER.

The test which the author applies is hypermanganate of potash or soda, which he prepares by heating the hydrate of potash or soda with chlorate of potash and peroxide of manganese, according to the method of Wöhler. After heating, the salt is thrown into water, and so much diluted muriatic acid is added that it assumes a bluish-red colour ; upon which carbonic acid gas is passed through until the colour has become bright red and the manganate of potash completely converted into hypermanganate. The liquid must be cleared, either by allowing it to deposit all the oxide of manganese, or by filtering it through asbestos. This liquid may be kept for a very long time unaltered in a glass vessel with a glass stopper. The next process is to ascertain the strength of the test, which is done by taking any determined measure of it, mixing it with water and a little alcohol, and then heating it. All the manganese is thrown down ; and after being washed and exposed to a strong red heat, it is the manganoso-manganic oxide, $MnO+Mn_2O_3$. This test is now applied in such a way that, for instance, one Pound of the water which is to be tried is mixed with a small quantity of the test, and boiled. If the colour has disappeared, another quantity is added, and the liquor again boiled, until, on going on in that way, the red colour of the liquid does not disappear any longer. After that it is allowed to cool, and then the quantity of hypermanganate of potash, which has not been decomposed for want of organic matter in the water, is determined by comparing its colour with distilled water, to which have been added very small determined quantities of the test solution. If the quantity of the test which is thus added in excess is subtracted from the whole quantity which has been used, the real quantity of decomposed hypermanganic acid is determined, and thus also the quantity of organic matter itself. This method is liable to one fault, *viz.*, that the nature of the organic matter may be different, and accordingly require different quantities of the test liquor to be decomposed. But the organic matter which generally occurs in water is nearly always identical with humic acid, and thus the determination of the organic matter allows it to be compared. As to that part of the organic matter in water which contains nitrogen, the author thinks that he has found out a method for determining it by itself; but not having yet finished his experiments on that point, he must leave it out of the question. Water taken from a greensand spring about twelve miles from Copenhagen contained so little

organic matter that 1lb. only required six measures of a test solution, of which 100 measures contained the manganese of 0·526 of the manganoso-manganic oxide; while 1lb. of water taken from a lake which communicates with a peat-moss required seventy-four measures of the same liquor. Prof. Forchhammer, continuing for a whole year every week the analysis of the water which is used for supplying Copenhagen, observed the following facts:—1st. The quantity of organic matter is greatest in summer; 2nd. It disappears for the most part as soon as the water freezes; 3d. Its quantity is diminished by rain; 4th. Its quantity is diminished if the water has a long way to run in open channels.—*Chemical Gazette.*

ON PATCHOULI.

BY SIR W. J. HOOKER.

Pogostemon Patchouli.—Pubescens, caule suffruticoso ramis vagis decumbenti-ascendentibus, foliis petiolatis rhombeo-ovatis obtusiusculis lobatis crenato-dentatis, spicis terminalibus axillaribusque densis pedunculatis basi interruptis, calycibus hirsutis bracteas ovatas duplo superantibus, dentibus lanceolatis filamentis barbatis.

Pogostemon Patchouli, *Pellet. in Mém. de la Soc. Roy. des Sc. d'Orl., tom.* 5, *n.* 6 (1845), *cum Ic. Benth. in De Cand. Prodr.* 12. *p.* 153.

Pogostemon intermedius, *Benth. in Wall. Cat., n.* 2327.

β ? spicis elongatis laxioribus subpaniculatis. P. Heyneanus. *Benth. in Wall, Pl. As. Rar.* 1. p. 31. *De Cand. Prodr.* 12. *p.* 153.

Hab. Silhet (Dr. Wallich); Penang and opposite shore of the Malay Peninsula (*Mr. G. Porter*). β. Ceylon, Java; Bombay (*Mr. Law*).

Authentic specimens in our Herbarium of *P. intermedius*, Benth., from Dr. Wallich, prove that this plant is identical with the Patchouli; but since by accident the species was omitted in the "Labiatæ" of De Candolle's "Prodromus," Mr. Bentham waives the right of priority, and desires the name of M. Lepelletier should be retained. He is, indeed, disposed to consider his *P. parviflorus* (Silhet, Assam, and Saharunpur), and even *P. Heyneanus* (Ceylon, Java, &c.), as not really specifically distinct;—thus the species would have a wide range of native locality, unless, as is probable, the plant be only cultivated in these several places.

EMPLOYMENT OF CASEIN AS AN ENVELOPE FOR MEDICINES.

BY G. JOZEAU.

In order to disguise the disagreeable odour and flavour of pills, and to increase their durability, M. Jozeau recommends their being coated with casein instead of with gelatin.

Take fresh casein free from butter, put it for twenty minutes into boiling water, press it strongly, and then dissolve it in a sufficient quantity of solution of ammonia, so as to form a liquid having the consistence of syrup; then mix it with sugar (about one-tenth of the weight of the casein), evaporate the whole to dryness, and rub to powder.

In order now to envelop pills with it, a small quantity of the powder is to be dissolved in water, so as to form a thick mucilage, with which the pills are to be moistened. They are then to be covered with the powder. The pills must be coated two or three times, according to the intensity of their odour and flavour. After the last coating of mucilage, they are to be dipped into slightly acidulated water, instead of being covered with powder, and are then to be dried.

NEW MODE OF EMPLOYING STARCH AS A TEST FOR MINUTE QUANTITIES OF IODINE.

BY M. L. THOREL.

This process, which is founded upon the sensibility of starch to the action of iodine, differs only from that usually adopted by Chemists in the method of eliminating the iodine, and bringing it in contact with the starch.

An ounce or two of the liquid to be tested is put into a bottle (if it be a solid it is mixed with water), and six drops of nitric acid, and the same quantity of hydrochloric acid, are added to it; a slip of paper previously dipped in starch-paste is placed over the mouth of the bottle, and heat is applied. If the liquor contain iodine, either free or in combination as an iodide or iodate, the starch-paper will acquire the characteristic violet-blue tint to a greater or less extent. The nitric acid will decompose the iodides if present, and set the iodine at liberty; the object of the hydrochloric acid is to replace the iodine, and decompose iodates if present.

If the paper be not coloured on first heating the mixture to the boiling point, a second addition of the two acids may be made, when the effect will speedily be produced. The colour will generally appear immediately, and will be gradually augmented. Should the colour not be developed, however, it must not be concluded at once that there is no iodine present, for it is difficult in the presence of some organic substances, of which treacle is one, to get the required indication. In such cases the process should be repeated, after adding to the liquor two or three grains of tartrate of potash dissolved in a little water. The mixture is to be heated for an instant before the addition of the acids, which are now to be added in the proportions of eight or ten drops of nitric acid, and four drops of hydrochloric acid. After thus testing, the evidence will be conclusive.—*Journal de Chimie Médicale.*

ON THE PRODUCTION OF MANNA.

BY MR. J. STETTNER.

The *Manna ash*, *Fraxinus ornus*, in the manna districts of Capace, Cinesi, and Fabarotto, where the best manna is obtained, does not form woods, as is commonly supposed, but is cultivated in separate plantations. These plantations generally present regular squares, hedged in with *Cactus opuntia*. The trees are planted in rows, and are from two to eight inches in diameter, with stems from ten to twenty-five feet high, which from the first shoot are kept smooth and clean. The soil is carefully loosened and freed from weeds. After the eighth year the trees yield manna, which they continue to do from ten to twelve years, when they are cut down, and young shoots from the roots trained: one root-stalk frequently yields from six to eight new trees and more. For the production of the manna, young and strong shoots are requisite; but they are not tapped till the tree ceases to push forth any more leaves, and the sap consequently collects in the stem. This period is recognised by the cultivators from the appearance of the leaves; sometimes it occurs earlier than at others, and the collection of the manna takes place either at the beginning of July or only in August. Close to the soil cross sections are made in the stem, and in the lowermost sections small leaves are inserted, which conduct the sap into a receptacle formed by a cactus-leaf. This is the way the manna *in sortie* is obtained. The incisions are repeated daily in dry weather, and the longer they continue the more manna is obtained. The stems are left uninjured on one side, so that the manna runs down

the smooth bark more easily. The next year the uninjured side is cut. The *Manna cannelata* is obtained from the upper incisions, more than forty of which may be counted on one tree. The sap there is not so fat as below, and consequently dries more easily into tubes and flat pieces. After the manna has been removed from the trees, it has further to be dried upon shelves before being packed in cases. The masses left adhering to the stems after removing the inserted leaves are scraped off, and constitute the *Manna cannelata in fragmentis*. *Cannelata*, *can. in fragm.* and *Capace* are collected at the same time from one stem—the more *Cannelata* from the younger, and the more *Capace* or *Gerace* from the older part of the stem. In Sicily the latter is designated *in sortie*, and is probably the most active. Dry and warm weather is essentially requisite for a good harvest.—*Hooker's Journal of Botany.*

COLOURING MATTER FROM ORCHIL.

BY ACHILLE CHAUDOIS.

In the ordinary mode of obtaining colouring matter from dye lichens or orchil, as much water is combined with the lichens or orchil as will bring the same to a pasty state, and then alkalies, such as liquid ammonia, are added (in some cases potash or urine and lime are used for the same purpose); but the colouring matter obtained in this way is not so pure as that obtained by the process which forms the subject of this invention, because the colouring extract is mixed with the "substantive" parts of the lichens or orchil. The patentee subjects the lichens or orchil to repeated washings in water until he has extracted the whole of the colouring matter therefrom; and then he treats the water in the same manner as the paste above-mentioned has been hitherto treated. The lichens or orchil may be washed in hot water only, or in water containing alkaline matters.—*Chemical Gazette.*

POISONING BY ARSENIC.

The following is an extract of a letter from Mr. Roberton:—

On the 22nd October last I was requested by a medical man to examine a substance which had been ejected from the stomach of a woman who had just died, as he suspected, from the effect of poisoning.

The suspected substance gave decisive indications of the presence of arsenic when treated with the ammonio-sulphate of copper, ammonio-nitrate of silver, and sulphuretted hydrogen tests. At the *post-mortem* examination which I witnessed, traces of arsenic were also visible on the surface of the stomach. On inquiry, I learned that the deceased had gone to a neighbouring Druggist, accompanied by a friend, and had purchased two-penny worth of arsenic, which she administered with her own hands.

Since the above circumstance has occurred, I have felt more than ever convinced of the impropriety of the Chemist retailing arsenic to the public under any circumstances. The caution adopted by some in requiring the person to bring a second party before selling it, is quite unavailing, as appears in this instance.

1, *Oxford Street, Manchester,*
November 8, 1849.

CASE OF POISONING BY MURIATIC ACID.

There is in the Marylebone Infirmary a young woman (named Collier) who, in consequence of a quarrel between her father and her lover, went out and purchased, on the 19th of November, two pennyworth of "Spirit of Salts," which she swallowed. The exact quantity is not known, but

is supposed to be about an ounce. The strength is also uncertain. There is, however, ample evidence of a strong corrosive poison. It would appear from her own account that she fainted almost immediately, as she can give no information as to what occurred afterwards prior to her admittance into the infirmary, under the care of Dr. Allen. This was about three hours from the time of taking the poison. She had taken alkalies by medical advice, and vomited violently. On her admission at 11 A.M. barley-water (containing ʒij of carbonate of soda to Ojss) was ordered *ad libitum;* also in the course of the day half a grain of muriate of morphia, with a drachm of oil of almonds. Leeches were applied on the pit of the stomach, and vomiting continued ; and at 8 P.M. the vomited matters were found tinged with blood. She complained of extreme cold in her lower extremities, which to the touch were quite warm. She also had violent cramps and contractions of the muscles of her upper and lower extremities. The morphia was repeated, with other appropriate treatment, which relieved the sickness. For two or three days her life was despaired of ; but there is now a prospect of recovery. She still complains of great pain in her legs and arms, as well as in her stomach, is very much reduced in strength, and unable to stand without assistance

A FAMILY NEARLY POISONED BY ARSENIC.

THE household of Mr. Amos, a respectable farmer of Witnesham, near Ipswich, was recently discovered to be suffering acutely from poison, the effects of which threatened to be fatal. The facts are these :—Soon after dinner the whole of the family, including the domestics, numbering altogether seven or eight persons, were seized with nausea and vomiting. It was at first ascribed to the indigestible nature of the meat, a joint of veal, but, upon inquiry being pursued a little farther, Mr. Amos found out, to his extreme horror, that they had partaken of poison, the joint having been " basted" with arsenic instead of flour. The dripping pan, it appears, when not in use, had been placed beneath a cupboard in which were deposited some packets of arsenic intended for wheat-steeping. One of the packets burst, and its contents slipped through a crevice into the dripping-pan, giving it the appearance of being well floured. When the pan was put down to the fire the supposed flour, which a cleanly cook would have removed, was allowed to remain as a matter of economy, no suspicion existing as to how it came there. On medical aid being procured, the alarming symptoms gradually yielded, and all the sufferers were soon out of danger.

A correspondent gives another version of the cause of the accident, namely, that the bag of arsenic had been placed for safety on a shelf inside the kitchen chimney, and that the chain of the smoke-jack had rubbed a hole in the bag.

BOTANICAL AND PHARMACEUTICAL DESIDERATA.

(From the Manual of Scientific Enquiry, edited by Sir F. W. Herschel, Bart.)

AFRICA (INCLUDING ARABIA AND ABYSSINIA).

Cape Aloes.—What is the particular species of *Aloe* affording the drug of this name? What is the kind used at Bethelsdorp, near Algoa Bay ?

Madagascar Cardamom.—Is it *Amomum angustifolium?* Specimens of the plant and fruit should be sent home.

Scitamineous Fruits of Western Africa.—A full collection of these (comprising the various kinds of cardamom), the plants, with roots and fruit, should be transmitted home, with the native names appended to them.

Myrrh.—Is the myrrh of commerce produced by one vegetable species, or several? If by several, specimens of each kind and of the plant affording it are desirable, accompanied by the native appellations. It is particularly important to know whether the myrrh of commerce be the growth of Arabia or of Abyssinia and the adjacent parts of Africa.

Euphorbium Gum.—What is the species of *Euphorbia* affording the substance thus called in commerce, and which comes from Mogadore? The stems found in the commercial Euphorbium are not those of the plant figured in Jackson's *Morocco*, nor yet are they those of *Euphorbia officinarum* or *E. Canariensis.*

Shea Butter.—Living plants and specimens in flower and fruit are required.

Galam Butter.—Is this identical with the Shea butter of Park?

Camwood.—The source of the dye-wood so called, from the Gold Coast, with specimens of the tree, are a desideratum.

Buchu of the South-African Hottentots.—To determine the different kinds collected by the natives.

Senna.—What plant yields the African senna? Richardson says it is brought from Ghat in the Sahara.

African Oak, or *African Teak.*—This wood, though largely imported by our royal dockyards from the western coast of Africa, is totally unknown botanically.

Ichaboe Resin.—The Ichaboe ships did, on more than one occasion, bring from the adjacent shores of Africa a gum-resin, constituted of the dead stems of a *Geranium*, allied to, if not identical with, the South African *Geranium spinosum* of Linnæus (*Monsonia Burmanni*, D.C.). An account of this substance appeared in *Eden's Voyage in Search for Nitre and the true Nature of Guano.* London: 1846. None is now to be procured in England, and it is believed that the nature and property of this singular gum-resin were not examined. Perfect specimens of the gum-resin and the plant are desired.

N.B. Much information remains to be obtained respecting the useful woods, gums, dye-stuffs, &c., of Western Africa.

(*To be continued.*)

THE PIMLICO SEWER CATASTROPHE.

We omitted to allude to this event last month, but it appears to be deserving of some notice on account of the chemical points involved in the inquiry. The facts are briefly these. On the 12th of September two men in the employ of the Commissioners of Sewers entered the sewer in Warwick Street, which communicates with that in Kenilworth Street. Shortly afterwards it was discovered that they were both dead. A third followed, in the hope of extricating them, and died also. A policeman entered the sewer to remove the bodies, and instantly died. Mr. Wells, a surgeon, imprudently followed the example, with the same fatal result. The bodies when removed from the sewer had assumed a greenish-blue slate colour, which has been compared to that of a bronze statue. Messrs. Phillips, Gotto, and Lovick, the Surveyors of the Commissioners, state in their report—"Upon carefully examining the ground forming the sides of the trench made over the sewer to get at the men, Mr. Phillips noticed at one place a stratum of green-coloured matter, six inches thick, about five feet above the sewer. He immediately procured some of this matter, which consists of lime refuse, used in purifying gas. Its smell being similar to the putrid smell issuing from the sewer, he thought it probable that, when the men entered the sewer to measure the deposit, it was full of gas emanating from this lime refuse, from its having impregnated the surface-

water, which, in its passage downwards, saturated the adjacent ground, and percolated through into the sewer. The men died immediately under the spot where the lime refuse was found." To ascertain the fact, he took a bottle of the fluid from the sewer, with the refuse he had previously taken out of the trench, to Dr. Ure for examination.

Dr. Ure reported that the refuse matter was gas lime (commonly called *blue billy*), impregnated with sulphuretted hydrogen, certain prussic acid compounds, and hydrosulphuret of ammonia; and that the water from the sewer afforded to chemical reagents similar results, with the addition of urine and other animal exuviæ,—the quanity of sulphuretted hydrogen having been increased by the action of the carbonic acid of the atmosphere on the liquor impregnated with the soluble constituents of the gas lime. He attributed the death of the men to the inhalation of sulphuretted hydrogen with the other gaseous compounds, and considered that the fatal result had been accelerated by the percolation of the surface-water through the gas lime, as previously supposed by Mr. Phillips.

Mr. Cubitt, who had constructed the road, conceiving this report to be an implied imputation against himself, caused a further investigation to be made by other distinguished Chemists; and the Commissioners of Sewers appointed Dr. Lyon Playfair to examine and report on this subject.

Dr. Playfair, having examined some of the sewerage liquor, furnished a report entirely at variance with that of Dr. Ure. He stated that the sewage liquor contained no cyanogen compounds; that it contained an excess of ammonia; and that neither prussic acid nor sulphuretted hydrogen could have been present in an uncombined state." He further stated that the ammonia; together with the corresponding equivalent of sulphuretted hydrogen emitted from animal and vegetable effete matter, would be quite sufficient to account for the death of the men.

Assuming the honesty of the statements made by Drs. Ure and Playfair, it must be obvious that the specimens examined by these Chemists could not have been of the same nature, and were, therefore, probably derived from different sources. Dr. Playfair states that his specimens were taken *not from the open trench, where plenty of gas lime had fallen in,* but at some considerable distance from the opening of the sewer.

Dr. Ure asserts that "the sewage stuff would yield nearly two ounces per gallon of pharmacopœia proof pure prussic acid, a dose sufficient to kill fifteen men." Dr. Playfair, in his rejoinder, states that he "would willingly undertake to drink the whole of the product of that (prussic) acid which Dr. Ure could obtain from the distillation of ten thousand gallons of a similar specimen." He asserts that there is "not one eight-millionth part of any compound of prussic acid in the three specimens of water" examined by himself. He arrived at this conclusion by testing the liquor for prussic acid without finding any indication; and afterwards, on adding to a pint of the same liquid a thousandth part of a grain of cyanide of ammonium, and testing in the same manner, he readily detected its presence. And he goes on to state, that even in the water in the open trench, where the gas lime had fallen in, there was not one-hundredth part of the prussic acid which Dr. Ure avers he found and gives as representing the composition of the sewage matters generally.

Dr. Playfair states that a saturated solution of the worst gas lime above the sewer does not contain twenty grains of any soluble sulphuret; from which he infers, that even on the supposition that the supposed infiltration had taken place, this would only have accounted for a very trifling part of the fatal impurities; and he says that "the prussic acid compounds, if they had filtered into the sewer, would have been quickly rendered innocuous by the soluble sulphuret, which exposed to air would form a sulphocyanide, a constituent of the saliva of man and all animals."

But he further declares that such infiltration could not have taken place; for "direct experiment proves that the iron in the clay underneath the gas lime arrested the sulphuret, and refused it a passage to the sewer."

This is positively denied by Dr. Ure, who affirms that there were other channels by which the liquor might have passed into the side of the sewer, where the bricks were not set in cement, without descending perpendicularly through the clay. Mr. Playfair states in reply, that had this been the case the bricks would have been discoloured; but he has admitted that there may be Prussian blue in the mud at the bottom of the sewer.

The real question at issue is this—Did the gas lime impregnate the water which found its way into the sewer with cyanogen compounds and sulphuretted hydrogen, which accelerated the death of the men?—or was their death occasioned by the ordinary emanations of a foul drain or cesspool? On this point hinges an important legal question. If Dr. Ure had been able to establish to the satisfaction of a jury his position, Mr. Cubitt might have been liable to pecuniary damages for compensation to the families of the deceased, on the ground that by making up the road with gas-lime he had been accessary to their death. The supposition that a trace of some cyanogen compounds existed in the mud, or even in the liquor of the sewer, would be irrelevant. It must be shown that these compounds existed in such a form as to contaminate the atmosphere of the sewer. The opinion of the jury and of scientific Chemists generally, on this subject, exonerates Mr. Cubitt.

NATIONAL GRANT FOR SCIENTIFIC PURPOSES.

It is reported that Lord John Russell has announced to the President of the Royal Society his intention to propose in Parliament an annual grant of £1000 for the promotion of science. Whether this sum is to be placed at the absolute disposal of the Royal Society, or of the Government, we have not heard. Nor do we yet know what are the precise objects to which it is intended to be devoted—whether for promoting scientific investigations, or for the encouragement and reward of scientific men.

Until we are made acquainted with the details of the proposed measure we scarcely know whether to regard it as a benefit or an injury to science. In times like these, when the Government is endeavouring to effect the most rigid economy in its various departments, it would be most unwise for Parliament to make so large an annual grant for scientific purposes, without taking good security that the objects to which it is intended to be devoted are praiseworthy, and that it cannot, and therefore will not, be jobbed away. Hitherto, however, we have no experience to enable us to anticipate any particular benefit which is likely to accrue to science from grants of this kind. What good has resulted from the Wollaston Fund or the Royal Medals? In the opinion of many of our most distinguished *savans*, the latter have proved rather detrimental than beneficial; and we believe that the Linnæan Society acted wisely a few years since (see *Pharmaceutical Journal*, vol. vi., p. 389—1847), in declining to accept the bequest, made by one of its members, of an annual gold medal. If Lord John Russell really desires, as we believe he does, to lend national aid to science, let him provide a proper building in which all the scientific and literary societies of the metropolis may hold their meetings, and where all the libraries and museums of these institutions may be congregated. This would be conferring an unquestionable benefit

on science and scientific men. Furthermore, if the Government were to subscribe to expensive English and Foreign works, and distribute copies of these amongst public and scientific libraries, another great benefit would be conferred on science. Government aid could not be more worthily bestowed at this time than on the Linnæan Society, now almost houseless, and without the pecuniary means of providing a proper receptacle for its valuable museum and library. We hope the Council of this Society will take immediate and active steps for placing before his Lordship the present unfortunate condition of this most useful Society.

NEW PRESIDENT OF THE LINNÆAN SOCIETY.

Mr. Robert Brown has decided to accept the unanimous invitation of the Council to be put in nomination as President of the Society. In a scientific point of view Mr. Brown is the fittest man in Europe to hold this distinguished office; and he will be doubtless elected unanimously. We hope, however, that he will not permit the continuance of the present torpid or sleepy state of the Society: we trust that both he and the Council will bestir themselves in order to obtain from the Government apartments in Somerset House, rent-free.

PROCEEDINGS AGAINST UNQUALIFIED PRACTITIONERS.

The following instructions have been issued in the form of a circular, for the guidance of those who may desire to institute proceedings under the Apothecaries' Act of 1815. We believe the circular is issued by the Medical Protection Society, under the authority of the Society of Apothecaries; but of this we have no evidence, as no name is attached to the document:—

The following observations, with respect to the evidence to be adduced in support of an indictment against an individual for practising as an Apothecary without legal qualification, should be placed in the hands of the solicitor retained to conduct the prosecution.

The offence imputed in these cases is, that the defendant, not having been in practice as an Apothecary prior to the 1st of August, 1815, has practised as an Apothecary without having obtained a certificate of qualification from the Court of Examiners of the Society of Apothecaries, which is made an offence by the 14th section of the Act 55 George III. c. cxciv., commonly called the Apothecaries' Act.

The prosecutor should, in the first place, satisfy himself that the defendant was not in practice as an apothecary prior to the 1st of August, 1815; and in the next place, that he did not hold a commission or warrant as surgeon or assistant surgeon in the army or navy, or in the service of the East India Company, which bore date prior to the 1st of August, 1826. (6 Geo. IV. c. cxxxiii., s. 4. Stevenson *v.* Oliver, 8 Meeson and Welsby, 234. Millbanke *v.* Grant, 3 Ad. & Ell. N.S. 690.)

If the defendant is not exempt from the operation of the Apothecaries' Act on either of the grounds above referred to, and has practised as an apothecary without having obtained the certificate of qualification required by the Act, he is liable to be indicted for a misdemeanor under the 14th section of the Act, notwithstanding the pecuniary penalty imposed by the 20th section.

The practice of the apothecary consists in attending and advising patients afflicted with diseases requiring medical (as distinguished from surgical) treatment, and prescribing, compounding, and supplying medicines for their cure or relief. The class of cases which it is the province of the apothecary to treat includes most of the diseases by which the human frame is affected; for instance, diseases of the brain, the lungs, the heart, the stomach, the liver, and the bowels, when the disorder is unattended by any external wound, sore, or tumour, and when medical treatment, unaided by any manual operation, is called for.

It is necessary, however, to be very careful in the selection of the particular instances of practice, because the defendant will probably endeavour to show, that in the cases given in evidence he acted in the character of a surgeon, or a man-midwife, or a druggist—in any character, in fact, but that of an apothecary. The following cases may be referred to as illustrating the functions of the surgeon, the apothecary, and the druggist respectively. Alison *v.* Haydon, 4 Bing. 619. 1 Moore and Payne, 588, S.C. Apoth. Co. *v.* Greenough, 1 Q. B. R. 799. 1 Gale and Davidson, 378, S.C. Apoth. Co. *v.* Lotinga, 2 Moody and Robinson, 495.

The first point, therefore, to establish in each case of practice, is the nature of the disease with which the patient was afflicted; next, that the defendant attended the patient, and prescribed and supplied medicines for his cure or relief; and lastly, that the attendance and supply of medicines were with a view to gain.

The disease may be proved either by the name given to it by the defendant himself, or, in the absence of any such direct evidence, by the symptoms of the disease, as observed by the patients themselves, or their friends. The defendant's attendance may also be proved by the patients or their friends. The supply of medicines must be proved by the person who fetched them from defendant's house, or, if they were sent by a servant of the defendant, that fact must be shown. The compounding of the medicines should be clearly brought home to the defendant; and if the medicines were sent or fetched from his house, and it cannot be proved, in any of the cases given in evidence, that the medicines were actually compounded in his house, it would be well to be prepared with proof of his being in possession of the means of compounding them.

A bill delivered by the defendant is important evidence, as proving frequently the attendance, the supply of medicine, and that both were rendered with an intention of being remunerated for them. A bill, however, is not absolutely necessary, as other evidence can be given to the same effect; for instance, that the defendant attended the patients as medical men ordinarily do, and that he gave no intimation that his services were gratuitous.

Midwifery cases, and cases consequent upon childbirth, and all cases where (although the disorder may be in its main features a medical case) there is any external wound, sore, or tumour, in addition, should be avoided.

Evidence should be adduced of the defendant's practice in six or eight cases at least.

It must be shown that the defendant has *not* obtained the certificate of qualification required by the Act; and, in the absence of a distinct admission by the defendant to that effect, the fact must be proved by the evidence of the proper officer of the Court of Examiners, and the production of their books.

It would be advisable to be prepared with general evidence to negative the supposition that the defendant was in practice before the 1st of August, 1815; that his age, for instance, would not admit of his having been in practice at that period.

If the registrar of births, marriages, and deaths should have been in the habit of receiving the defendant's certificates of the cause of death, such certificates will materially assist in supplying evidence of the defendant's practice, inasmuch as not only is the fact of attendance admitted on the face of the certificate, but the disease of the patient is also stated.

THE SUGAR PATENTS.

Dr. Scoffern having called upon the Editor of this Journal to make an appointment, for the purpose of hearing evidence (confidentially) in contradiction of a statement in our last number (page 220) respecting the experiments undertaken by him for Mr. Sievier,—this was declined on the ground that such a course would be at variance with the impartiality which we always wish to maintain. At the same time he was informed that a counter-statement would be inserted *on his authority* if he should desire it.

The letter forwarded by Dr. Scoffern for this purpose contains much irrelevant matter, and also some vituperative remarks on the character of a Chemist, supposed by him to be the author of the article in question, but who neither saw it prior to publication nor was in any way communicated with in reference to it. As the letter is "to be published *entire* or not at all," we omit it. Dr. Scoffern designates the account of his transaction with Mr. Sievier as a "base fabrication;" and the statement respecting the objection urged against his process at the meeting of the British Association as an "untruth." He also asserts that the lawsuit has been promoted by him, and not by the other party, and that pending this lawsuit he is restrained from producing his evidence.

THE RISE AND PROGRESS OF A SPECIFIC.

A Correspondent lately made an inquiry respecting *Murray's specific for the gout.* We have now obtained the history of this nostrum. Mr. Murray, about five years ago, was a servant of Col. Rowan (one of the Police Commissioners). He represented, about that time, that he was possessed of a secret, which had been in his family for *several generations* (*!*), for curing the gout. On examination we find that his specific contains iodide of potassium, sulphate of magnesia, and some aromatic tincture, apparently compound tincture of cardamoms. Considering the comparatively recent introduction of iodide of potassium into the Materia Medica, it would appear that the family of Mr. Murray was very early in the secret, or that the term *generation* was not applied in its usual sense. It is stated that a few years ago he was employed at a public institution to dispense medicines; probably he gleaned his medical knowledge during those manipulations. However that may be, he is now established in Clarges Street, and has issued a pamphlet in praise of his nostrum. The author commences with a sonnet, and proceeds with a novel, encouraging, but non-medical treatise on gout, adds a long list of testimonials, and concludes by stating that he will allow no quack agents to sell his medicine, "nor will it be procurable from Chemists and Druggists."

Among his patrons are Lord Ellesmere; Lewis Ricardo, M.P.; Lady Mills; Madame Tussaud; the Rev. George Hanbury; the Porter at Apsley House; the Cook at the Athenæum; Lady Charlotte Greville; and other "distinguished noblemen and gentlemen in town and country!"

This instance, among others, serves to show by what class of persons secret nostrums are pushed into notoriety.

LAYS OF THE LABORATORY.

Hydrogen to Chlorine.

Oh ! tell me, when wilt thou be mine,
My beautiful, my green ?
Oh ! say our atoms shall combine,
My love—my own Chlorine !

How slowly will the moments pass,
The sand of Time will run
As Muriatic Acid Gas,
Till thou and I make one !

Magnesia, the Forsaken One, to Sulphuric Acid.

Thou hast left me for another ;
Be it so, since we must part :
Scorn'd affinity I'll smother ;
Go, unconstant as thou art.
Since Baryta, me forsaking,
Thou hast chosen for thy mate,
I, a worthier partner taking,
Will become a Carbonate.
To a rival more alluring
Now Magnesia yields thee free;
Form with her a more enduring
Sulphate than thou didst with me !

Ammonia ; a Duet.

Ammonia so frolicsome, whither away ?
To sport in the breeze like a butterfly gay.
Still lively as ever, thou aëriform thing !
My delight is to constantly be on the wing;
So I'll merrily, merrily, soar to the sky,
For you know I'm the volatile Alkali.
Tra, la, la, la.

Punch's Pocketbook.

REVIEWS.

Histoire Naturelle des Quinquinas, *ou Monographie du Genre Cinchona; suivie d'une Déscription du Genre Cascarilla et de quelques outres Plantes de la même Tribu.* Par M. H. A. Weddell, M.D. Ouvrage accompagné de 34 planches. Paris, 1849. Fol., pp. 108.

[The Natural History of the Cinchonas, *or Monograph of the Genus Cinchona ; with a Description of the Genus Cascarilla, and of some other Plants of the same Tribe.* By M. H. A. Weddell, M.D. With 34 plates.]

We are anxious to draw the especial attention of our readers to this magnificent work, copious extracts from which appeared in our last number, and others appear in the present one. The circumstances which led to its production have been already explained, and we therefore now proceed to give an analysis of its contents.

In an *Introduction* of fifteen pages, the author gives an historical notice of the principal travels in the cinchona regions, his itinerary, and a description of the mode of collecting the cinchona barks. In our last number we made copious extracts from this part of Mr. Weddell's work, with a description of the manner of collecting the bark, and in the present number we subjoin a woodcut illustrative of bark-peeling in the valley of San Juan del Oro.

BARK-PEELING IN THE VALLEY OF SAN JUAN DEL ORO.

The author then proceeds to the *description of the genus Cinchona.* This part of the work occupies sixty pages. After giving the generic characters of the cinchonas, he makes some observations on the barks which this genus furnishes, and concludes with a summary of the *data* which his researches have furnished on this subject. A translation of this part of his work will be found in the present number of our Journal (see page 267). He then gives a description of the geographical distribution of the genus, and proceeds to notice the species, of which he makes twenty-one, each of which he describes. They are as follows :—

1. *C. Calisaya** †	8. *C. micrantha**	15. *C. asperifolia** †
2. " *Condaminea**	9. " *pubescens**	16. " *Humboldtiana**
3. " *scrobiculata**	10. " *cordifolia**	17. " *Carabayensis** †
4. " *amygdalifolia** †	11. " *purpurascens** †	18. " *Mutisii**
5. " *nitida**	12. " *ovata**	19. " *hirsuta**
6. " *australis** †	13. " *Chomeliana** †	20. " *discolor*
7. " *Boliviana** †	14. " *glandulifera**	21. " *Pelalba*

We have indicated by an asterisk * the species figured in Mr. Weddell's work, and by a dagger † the new ones which are described for the first time by our author. Undoubtedly, the most important species is the one which yields quinine, and which our author calls *C. Calisaya.* In our last number (page 232) we gave a brief botanical notice of this new species, but we propose to present a more complete account of it with a figure in a subsequent number. Mr. Weddell concludes his account of the genus cinchona by a tabular view of the cinchona barks, with the botanical names of the species from which they are supposed to be obtained. A translation of this table appeared in our last number (page 240).

The last part of Mr. Weddell's work is devoted to those *genera of the cinchona tribe which are either new or but little known.* This part of the work occupies twenty-four pages, and is devoted to the consideration of thirty-one species belonging to six genera, namely, *Cascarilla*, *Ladenbergia*, *Pimentelia*, *Gomphosia*, *Lasionema*, and *Chrysoxylon.*

Such is a general view of the nature of the subjects discussed by Mr. Weddell in his splendid volume. The work is got up in too costly a style to be in the hands of many private individuals, and we therefore propose to lay before our readers, from time to time, translations of some of the more interesting parts of it.

Heber die Unorganischen Bestandtheile in den Organischen Körpern. Von Heinrich Rose.—[On the Inorganic Constituents of Organic Bodies].

PHARMACEUTICAL CABBAGE.

According to the usual and proper courtesy between editors, when extracts or quotations are made, the source whence the articles are taken is acknowledged. Some of our contemporaries are in the habit of applying the scissors freely to our Journal, purveying the result of our labours to their readers as if composed, translated, or arranged by themselves. This is technically called "cabbage," and the persons so acting are "greens," who appropriate the "Attic salt" of others to supply the deficiency of seasoning at home.

TO CORRESPONDENTS.

"The New Pharmacopœia."—Several correspondents have sent communications inquiring when this work is likely to appear. [It is quite impossible for us to answer the question. One of the letters alluded to contains some suggestions respecting galbanum pill and compound extract of colocynth, which will be noticed in a future number.]

Mr. Shrubsole suggests, as a precaution to prevent accidents like the recent one in the Kenilworth sewer, the adoption of an apparatus for purifying the air prior to respiration, by passing it through milk of lime. The apparatus is similar in principle to Mudge's Inhaler, and adapted to the face so as to exclude impure air. This suggestion has already been under consideration.

Outis.—1. Ink stains may be removed by oxalic acid and other acids, also by chloride of lime.—(2.) Grease by French chalk powder, a hot iron being held over it; also by means of either.—(3.) Ironmoulds by oxalic acid.

S. T. B.—By colocynth pulp we understand the pulp without the seeds.

Perseverantia.—(1.) *Lindley's Vegetable Kingdom, Balfour's Manual of Botany.*—(2.) We shall announce it as soon as we have authority.—(3.) No.

E. L. V.—We have tried many formulæ for incence, but none of them were sufficiently eligible for publication. We have been told that it is sometimes made with two parts of olibanum and one of benzoin.

M. H. A.—(1.) The words in the prescription are olei ricini communis.—(2.) We have no practical experience in the preparation of a fluid water-colour from saffron.

Mr. Edwards.—When Vin. Ferri. Nov. occurs in a prescription, we should understand the preparation of P.L. 1836 to be intended, that being the one which speedily spoils by keeping, and should therefore be used new. The former vinum ferri is but little if at all liable to change, and would be unexceptionable if its strength were not uncertain, depending, as it does, on the condition of the wine employed. This objection might be overcome by the solution of a definite quantity of tartarised iron in good sherry, regulating the strength according to the Pharmacopœia.

M. L. D.—We have no authentic analysis of Brande's Enamel.

Carolus.—We believe "Benzole" may be had of Messrs. Heathfield and Burgess, Princes Square, Finsbury.—*M. L. D.* directs our attention to the following Erratum in our number for September, p. 144—℥ij. of tinct. ginger and kino being stated instead of ʒij.

Mr. Williamson.—The lotion consisting of expressed oil of mace, oil of almonds, liquor ammoniæ, sp. rosemary, and rose-water, is not easily incorporated. The two oils should be very carefully incorporated at first, and the other ingredients added gradually, with continued trituration.

"*Frater.*"—(1). Chemists are allowed *by sufferance* to sell spirit of wine *for medicinal use*, but for no other purpose. It is not safe to sell it to strangers without a written order stating that it is for medicinal use, which order should be preserved. The addition of any substance to "medicate" it does not at all diminish the liability, if merely added as an evasion.—(2.) Cayenne essence and camphorated chloroform are not officinal preparations. We have no formulæ for them.

Mr. Cole.—Wax is bleached by melting in water and exposure to light and air. Sometimes chlorine is *improperly* used, and spermaceti is added.

Mr. Ward.—A person professing to act as a visiting apothecary or surgeon is not eligible as a member of the Pharmaceutical Society.

C. Carlisle.—(1.) See Vol. vii., No. vii. The major and minor examinations of the Pharmaceutical Society are conducted at 17, Bloomsbury Square.—(2.) HARROWGATE SALTS:—chloride of sodium, 500 gr.; crystallised chloride of calcium, 150 gr.; chloride of magnesium, 90 gr.; bicarbonate of soda, 250 gr.; sulphuret of sodium, 120 gr., to 1 gallon of water.

E. W.—The questions of the professors published in this Journal refer to examinations for prizes.

Alpha.—Ure's *Dictionary of Arts and Manufactures.*

A. K., A. P. S.—Fownes's Manual of Chemistry.

Gulielmus.—See Vol. vii., No. vii. Reading with much perseverance may to a certain extent supply the place of lectures. It is necessary to pass the examination.

H. W. (Ross).—The letter has been received.

Galenus.—(1). No material deviation should be made from the directions of the Pharmacopœia in the preparation of syrups. There is good reason for not boiling some of the syrups, such as syrup lemons, and others containing free acid, as the cane sugar would be thereby converted into grape sugar, which is much less soluble.—(2). The method described is that usually adopted.

J. C., A. P. S.—Brass Lacquer.—℞ Shellac, gamboge, dragon's blood, each 120 parts, saffron 30 parts, rectified spirit 1000 parts. Digest with heat and strain.

Progressive Development.—The point alluded to in the question can only be determined by experiment, as there are no tables that we know of relating to such mixtures. Our correspondent would find no difficulty in making the spirit of the required density, and ascertaining the proportion of rectified spirit used for the purpose.

T. B. (Swansea).—(1). There is no law to prevent a Druggist calling his establishment "Medical Hall."—(2). There is no law to prevent a Druggist from practising tooth-drawing and blood-letting.—(3). The formula for Solution of Muriate of Morphia of the Edinburgh Pharmacopœia, in the last edition of Gray's Supplement, is correct.

Hyd. Chlor.—Refer to *Walker's Electrotype Manipulation*, sold by Knight, of Foster-lane.

M. P. S.—Noad on Electricity, &c.

J. W.—Tallow is frequently bleached by means of chromic acid. Solution of bichromate of potash and hydrochoric acid being added to the melted fat.

H. J.—Infusion of red cabbage is made by digesting the sliced cabbage in boiling water acidulated with sulphuric acid, straining, and then neutralising the acid with an alkali.

A. Z.—(1). The following test for croton oil is given in the Edinburgh Pharmacopœia:—When agitated with its own volume of pure alcohol and gently heated, it separates, on standing, without having undergone any apparent diminution.—(2). Formulæ for hair dyes will be found in Gray's Supplement.—(3). For the cause of the gelatinization of tincture of kino, see *Pharmaceutical Journal*, vol. i., page 399.

We have received a review cut and dried for insertion, apparently from the author of the work, which we have not seen!!

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the EDITOR, 338, Oxford Street, before the 20th of the month (if Answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. IX.—No. VI.—JANUARY 1st, 1850.

THE SALE OF POISONS.

THE PROGRESS OF THE INQUIRY.

It is extremely difficult, among the various facts and opinions contained in upwards of twelve hundred communications, to arrive at a speedy and satisfactory conclusion. It was not to be expected that all parties would at once acquiesce in the propriety of a legislative enactment interfering in some degree with their business arrangements; still less was it to be expected that all would agree as to the precise nature of the regulations most calculated to produce the desired effect.

It is, however, satisfactory to observe, on reviewing the whole correspondence, the great caution which prevails among our members generally in the sale of poisons. Many propositions have been submitted for consideration founded on the experience of the authors, and embodying the regulations they adopt in their own establishments; and numerous cases are recorded which evince no less sagacity than caution in the prevention of accidents or crimes. Apart from the ultimate object of the inquiry, the fact is established that among a very large number of our members, the same kind of regulations are voluntarily adopted which have been suggested as the basis of a legislative enactment, and although this does not detract from the importance of the investigation, it shows at least that the glaring evils which it is the object of the present movement to remedy, cannot fairly be attributed to the Chemists as a body. We are justified in stating that a general desire prevails among the members of our Society to sanction any practicable plan which might be contrived for diminishing the facilities now existing for criminal and accidental poisoning; and if some entertain doubts as to the practicability of attaining this object by legislative means, there appears to be no disposition to oppose the full and impartial consideration of the subject, with a view of collectively arriving at a definite and harmonious conclusion. We purposely avoid going further into details at present, as it would not be right, pending the investigation of the Committee, to give any bias to opinions, which, in order to carry weight, must be based upon facts.

PHARMACY IN GUERNSEY.

We have at various times given some account of the state of the laws relating to Pharmacy in other nations, and we are anxious, if possible, to extend this series of historical notices so as to include every nation, state, or province in which special regulations exist in reference to this branch of the profession. Among the correspondence which has arisen out of the recent inquiries concerning the sale of

poisons, some interesting information has been received from Mr. Thos. P. Naftel (one of our Members) at Guernsey. In returning the replies to the list of questions, Mr. Naftel makes the following statement respecting our profession as exercised in that island:—

"Both parties, the public and the profession, are severally protected, and this last maintains that rank and respect to which, as a profession, it is entitled.

"Any person desirous of establishing himself as a Chemist and Druggist, is obliged to deposit for inspection, with the law officers of the Crown, his credentials, consisting of indenture, certificates of character, and of having served at least five years under a qualified and recognised person. The applicant is then presented to the Court by the Crown officers, and, on their report, the Court sanctions the application or not, according to circumstances. If allowed, it is registered on the records of the island, of which the party can always obtain a copy, to be useful to him elsewhere should he at any time leave the place.

"The sale of drugs is prohibited to any one else but the Chemist; and all other poisons, except arsenic, are generally refused, if not on the order of a medical practitioner. Accidents in dispensing, I am happy to say, are of very rare occurrence, indeed, almost unknown.

"From what I have said you will also observe that the business of a Chemist and Druggist in Guernsey is distinct, and almost exclusively confined to dispensing and the retail of drugs, including spices.

"It would much benefit both the community and the Chemists in England, were regulations similar to the above enacted and insisted upon by the legislature, and even by corporations for their respective towns."

THE MEDICINE STAMP ACTS.

SAILING NEAR THE WIND.

We revert to this subject in consequence of several informations which have been brought under our notice during the past month, and which might have been avoided by a more prudent observance of the instructions laid down. While we are claiming protection against unjust and arbitrary proceedings on the part of the officers employed by the Commissioners, it is only fair, on the other side, to discountenance anything which wears the semblance of an evasion, and we advise our members, instead of sailing too near the wind, to take care to be on the safe side. In all cases of doubt it is better to affix a stamp than to run the risk of a penalty. The stamp is paid for by the public, the penalty is paid by the Chemist. But we submit that an evasion of the law, even if successful, is impolitic, as ingenuity of this kind obliges the Commissioners to resort to similar tactics, and is calculated to lead to a more rigid interpretation of the law than would otherwise be necessary.

The instructions which we have given on authority respecting the interpretation of the Medicine Stamp Acts, are sufficient to protect the cautious Chemist against prosecutions resulting from ignorance on his part. It is the original and primary object of these Acts to impose a tax upon patent and proprietary nostrums, a class of medicines

usually puffed in an extravagant manner, and realizing a large revenue; sometimes issued by ignorant quacks, and frequently recommended for a variety of disorders, in terms calculated to mislead, and therefore to injure the public. Thus far the tax may be considered a tax upon the gullibility of John Bull.

But in this case, as in many others, it is extremely difficult so to legislate as to include all the parties intended, without inflicting injury on others who infringe on the principle in a minor and less objectionable degree. A Chemist who furnishes domestic medicines without giving to his customers the requisite information respecting their several uses and doses, incurs an obvious responsibility, and it would appear a convenience to both parties, as well as a proper precaution, to insert this information on the printed labels. Such a course, however, if allowed with exemption from stamp duty, would open the door to infringement by those to whom this tax is especially intended to apply. *The law recognises no distinction between the Chemist and the quack*. If A. B. may recommend his medicines on printed labels or handbills, C. D. may do the same. Some line must therefore be drawn. It has been suggested that the existence of a secret in the formula or mode of preparation should constitute the liability. But if so, a quack might evade the law by publishing a fictitious formula, and a manufacturing Chemist might be subject to the tax on introducing a new chemical. The law therefore enacts that a recommendation for any disorder, whether on the label, or a handbill, or in a public advertisement, renders a medicine liable. This, and the other regulations already published, are, as we observed above, sufficient for the cautious Chemist.

To those who are apt to hover about the boundary line, like the skater who is attracted by the word "Dangerous" on a sign-post, a few words of advice may be useful, and this will be more intelligible in the form of examples. We have before us a label for *Essence of Ginger*, respecting which nothing is stated but the dose, and how it is to be taken. But the label contains an allusion to the restorative powers of ginger in certain disorders named. Another label for *Essence of Ginger* and *Chamomile*, is drawn up with the same ingenuity, under the idea that because the essence itself is not recommended, therefore the medicine is not liable. We need scarcely state that this is considered by the Commissioners of Stamps to be an evasion, and the medicine is liable.

Aromatic Quinine Wine is indirectly recommended on a label in a very concise essay on the medicinal virtues of bark, and the discovery of quinine as the active principle is mentioned as a "prominent example of the advantages which medicine has derived from Chemistry." We could not recommend this as a safe label, although it might possibly escape. Again, a "*Cordial Tincture of Turkey Rhubarb*, prepared from the finest Turkey Rhubarb, combined with the most approved aromatics of the Materia Medica. Dose, as a stomachic or digestive, one dessert spoonful," &c.; "as a warm laxative, two table-spoonfuls." Here no disorder is mentioned, and the directions merely explain two distinct properties of rhubarb, dependent severally on the dose. In the same manner the dose of oil of turpentine must be regulated according to the object for which it is taken, whether as a diaphoretic, a diuretic, or a vermifuge. On this principle the state-

ment on the above label might be admissible, being construed not as a recommendation but as a necessary method of defining the dose. The doubt, in this instance, hinges on the question whether the composition is or is not a secret nostrum, the term "approved aromatics" being indefinite. We should, therefore, class this among the labels on the boundary line, and therefore unsafe.

"*Dr. Gregory's Stomachic Powder.* Dose, a tea-spoonful in a glass of water." "*Cough Pills*, one occasionally." "*Antibilious Pills*, one or two a dose." "*Heartburn Lozenges*, one occasionally." These, and other medicines similarly described (although liable according to the strict letter of the law), are safe according to the instructions of the Board, published in vol. viii, p. 154.

If it be stated on the label, "*Dr. Gregory's Powder*, a valuable stomachic in cases of Dyspepsia, Heartburn," &c. "*Pills for Cough*," *&c.* "*Pills for Bilious Complaints*," "*Lozenges for Heartburn*," *&c. &c.*, then the medicines are liable.

This may at first sight appear to be a distinction without a difference, but it is not so. The use of the adjective is permitted merely by way of definition, to enable the public to distinguish one kind of medicine from another. If the other form of expression were allowed, a list of disorders without limit might be added, for the purpose of evading the law altogether. There is no remedy for this anomaly except an alteration of the law, and until this can be effected, we advise our Members to avoid sailing too near the wind.

PENALTIES FOR SELLING SPIRIT OF WINE.

SEIZURE OF ILLICIT SPIRIT.

Numerous informations have recently been laid against Chemists and Druggists and others for selling spirit of wine, more particularly illicit spirit, which has been in circulation to a considerable extent. Penalties of various amounts, from £1000 to £100 have been inflicted, subject to reconsideration, with a view to mitigation, in the event of memorials being presented.

We are informed that the illicit spirit is sold at about 10*s.* a gallon, sometimes as low as 6*s.*, and an idea prevails among some parties that this article may legally be purchased for certain purposes. This is a very dangerous mistake, and we advise all Chemists who value their reputation and the credit of their profession, to avoid purchasing spirit when offered by strangers. It is carried round by the makers, or their agents, to the shops of Chemists, and offered for sale by sample.

The honest tradesman who pays 17*s.* 6*d.* or 19*s.* for duty-paid spirit has no chance in competition against those who purchase the article at less than half the price; and those who embark in this illicit traffic are not likely to be gainers in the end, as a penalty of a few hundred pounds would more than counterbalance their extra profit, besides injuring their character as honourable men.

In many instances French polish and other compounds made with illicit spirit have been seized, and we have been informed that several hundred persons (including oilmen and grocers) have been prosecuted.

The powers of the Excise are so despotic, that the defence even of an innocent person is extremely difficult, and in many cases the parties accused have been advised by their solicitors to plead guilty, and throw themselves on the mercy of the Board, instead of incurring the expense of a defence on such disadvantageous terms. It, therefore, may happen occasionally that the innocent suffer with the guilty. If this should be the case with any of our Members during the present proceedings, it would be advisable to appoint a meeting to consider what course should be adopted for obtaining redress, in which we shall be glad to render any assistance in our power.

Without doubt fraud has been carried on to a great extent, and we hope the Members of the Pharmaceutical Society will use all their endeavours to discourage and expose a kind of traffic which is no less impolitic than discreditable. Very great injury is inflicted on our whole body by these delinquencies. The chairman of the Board of Excise informed a deputation of the Society some years ago that it was the desire of the Board to afford every indulgence to Chemists, that justice or the wants of the public might require in regard to the sale of spirit of wine in the exercise of their legitimate business; but that stringent regulations were found necessary, in consequence of the extent to which frauds on the Excise were committed by persons taking advantage of this indulgence. It had become a regular system to hawk about small quantities of illicit spirit to the retail shops of grocers, oilmen, and chemists, and although each transaction was small in amount, the total was so large that it was found necessary to enforce a general prohibition of the sale of spirit by unlicensed persons, as the only effectual means of putting an end to this system of fraud. Hence arose the persecution of Chemists reported in former numbers of this Journal. Subsequently, a concession was made in favour of Apothecaries and Chemists, who were permitted to sell spirit in small quantities for *medicinal purposes only*. This privilege is again in jeopardy, and if the strict prohibition should be re-introduced, we shall have occasion to thank the delinquents of 1849 for bringing back upon us the troubles of 1844-5.

It is of the highest importance for the Pharmaceutical Society to discountenance in the most unequivocal manner any frauds on the revenue or other disreputable practices. This has always been our policy, and on this ground rests the influence of the Society in protecting the interests of its Members. But in order to enjoy this protection it is necessary that we should individually and collectively have "clean hands."

We advise our Members to refresh their memory, on the subject of the regulations respecting the sale of spirit of wine, by reference to vol. iv., pages 480, 493, and 577; vol. vi., pages 99, 101, and 145.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

At a Meeting of the Council held on Wednesday, the 12th of December, Peter Squire, Esq., *President*, in the chair, the

COMMITTEE ON THE SALE OF POISONS

presented the following preliminary

REPORT

On the Answers received in Reply to the List of Questions proposed by the Committee, in reference to the Sale of Poisons, *especially of* Arsenic.

In the sale of small quantities of arsenic,* the practice of obtaining an indifferent witness is adopted by a large majority of vendors. In many cases, a written entry is made in a register, and signed by all the parties; the word "arsenic" is invariably put on the inner paper, and "poison" on the outer, or *vice-versâ*, and sometimes both words are placed on each paper, either in writing or by printed labels. In many cases, the principal of the shop, *only*, supplies the demand, but does not admit any of his own people as witnesses. It is sold usually to well-known customers. It is often coloured, or mixed with lard, soft soap, tar, &c. In some instances, where strong grounds of suspicion have existed, cream of tartar has been given with all the formality used in supplying arsenic, by which substitution suicides have been prevented. Many lives have also been saved by other precautions on the part of Chemists, to whom application has been made for poison.

The principal purchasers of arsenic are colour and chemical manufacturers, farmers, flockmasters, veterinary surgeons, shipwrights, glass manufacturers, candle-makers, and dyers, these employ it largely; but the smaller or retail quantities are demanded by braziers, whitesmiths, bird-stuffers, gamekeepers, gardeners, grooms, whitewashers, painters, firework-makers, and by rat-catchers, housekeepers, an others of all classes, for the destruction of vermin of all kinds.

By many Druggists in the country, arsenic is kept in one pound an half-pound packets, weighed, wrapped, and labelled, and it would be delivered to any shepherd or farmer's servant in any quantity, on application by written order; or a pound or more would be sold, with the usual precautions, to any known customer connected either with farming or flocks, with whose requirements the seller was fully acquainted. Arsenic is used in dipping sheep, and it requires about forty pounds of arsenic for every 1000 sheep. Some dippers number 40,000 sheep. Many Druggists sell upwards of one ton of arsenic per annum.

The dippers are subject to serious affections of the hands. The death of one is reported from Braintree. Deaths amongst the sheep are frequent; but these are attributed to the carelessness of the operators.

Arsenic is largely employed in steeping wheat. Persons in drilling the wheat so prepared have been seriously affected, although this is

* Many Chemists refuse to sell it.—Ed.

attributed by some to the lime necessarily used with it. Accidents have also occurred from the subsequent use of vessels in which the arsenic had been prepared. Many deaths have been known to occur amongst the stock from eating this prepared wheat, *viz.*, horses, calves, pigs, and fowls; and also coveys of partridges, pheasants, and many small birds. With regard to calves thus poisoned, one lot can be shown to have been sent to the London market.

In many districts sulphate of copper has superseded arsenic in the preparation of wheat. This process possesses the advantage of not requiring lime. In other parts the use of arsenic for this purpose seems to be unknown. Other substitutes for arsenic are proposed for washing sheep. The poisoning appears to have resulted, in some cases, from the purloining of arsenic by farm servants; in others from the facility with which it may be procured from the village shops. The care observed by the Druggists in obtaining a witness and labelling the parcel is often of no avail, for the suicide and the murderer have respectively accomplished their determined purposes notwithstanding every precaution. Oxalic acid and laudanum are extensively used.

The Committee in reporting progress, being in expectation of many other letters, defer the final report until after the next meeting of Council.

Another meeting of the Committee was held on Monday, Dec. 17th, to examine the communications subsequently received, and to consider the bearings of the entire correspondence on the question at issue. This correspondence being very voluminous, and requiring much careful arrangement and investigation, the Committee were not prepared to agree upon a final report, but adjourned the question for further consideration.

EVENING LECTURES.

The Evening Lectures on Electricity and Magnetism by Mr. Redwood, the commencement of which was noticed in the last number of this Journal, have been continued every Wednesday through the past month, excepting Christmas week. The number of lectures, which was originally intended to be six, will be extended to eight, the lecturer having found it difficult to bring the subject within narrower limits. One lecture was occupied with the subject of magnetism, three have been devoted to frictional electricity, and two to thermal and voltaic electricity, including the calorific, luminous, and chemical effects of the latter.

Electro-magnetism still remains to be treated of in the two concluding lectures, which will be given on the 2d and 9th of January.

Some inconvenience having been experienced on the first evening of these lectures, from the crowded state of the rooms, which rendered the atmosphere oppressive, an alteration was made in the ventilation of the room, which has proved perfectly successful. The plan adopted, which is the contrivance of Mr. Sherringham, consists in making four circular holes of six inches in diameter through the external wall of the room immediately under the cieling, and fixing a flap before each hole, which when closed excludes the external air, and when opened by a string, gives to the current of cold air which then enters, an ascending

direction, and thus prevents it from falling on to the heads of those seated beneath the opening. The cold air, after passing along the ceiling, becomes sufficiently warmed from contact with this surface, and admixture with the more rarified air of the room, to prevent the annoyance otherwise experienced from draughts.

The attendance at the lectures, and the interest manifested in the subjects, have continued unabated.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Colquitt Street, Friday Evening, November 23,

THE PRESIDENT IN THE CHAIR.

DR. BRETT delivered his first lecture on ARSENIC, in which, after describing the symptoms and morbid appearances in cases of poisoning with arsenic, he proceeded to the consideration of the specific action of arsenic as a poison.

A question has arisen, he said, "Can arsenic be detected in the blood?" Twenty-five years ago toxicological works stated it *could not.* Orfila within the last few years has detected it in the blood both during life and after death, also in every soft organ of the body, and in the urine. Antimony, copper, and lead, have been also found in blood and milk. Dr. Brett had himself detected it in the spleen, diaphragm, tissue of the stomach, tissue of intestines, pancreas, liver, kidneys, brain, muscular fibre. This proves that *it is carried through the system by the blood.*

How then does arsenic act as a poison? Is it specific in its action? or does it combine chemically with the organic tissues?

Liebig, in his *Organic Chemistry*, part ii., chap. xiv., p. 358, considers that "these substances" act as poisons by entering into definite chemical combination with albumen and muscular tissue, forming such stable compounds as the "*vis vitæ*" is unable to break up, and therefore the vital functions are destroyed. Dr. Brett's objections are these:

1st. Soluble salts of arsenic act more poisonously than arsenious acid itself.

2d. Symptoms have immediately followed taking the poison.

3d. Minute quantities have produced violent symptoms and even death.

4th. Insoluble compounds of arsenic are poisonous.

5th. It is detected in all the soft organs, both in contact and remote, also in the secretions.

6th. The speedy destruction of life by arseniuretted hydrogen and arsenical fumes.

7th. The variations in symptoms and morbid appearances.

8th. Gelatinization and ulceration of tissues.

9th. Readiness with which arsenic may be dissolved out from tissues after a great lapse of time, and the following experiments:—

1. Half gr. As O_3, mixed with 113 grs. white of egg, gently heated for some time, and the coagulate afterwards boiled in water for a few minutes—arsenic was found in the water.

2. Quarter gr. to 260 grs. white of egg, same treatment and result.

3. Quarter gr. to 363 grs. of warm blood, arsenic was found in the water with which the coagulate was boiled.

Cases were quoted in support of the foregoing statements.

In cases of recovery has any one *seen*, or examined "an eschar?" has any definite compound of arsenic and *tissue* been proved to exist? Is it likely that when arsenite of potash is taken that albumen takes arsenious acid from potash, and forms an insoluble compound? Does not potash take arsenious acid *away* from a coagulate of albumen with the greatest ease? Is it credible that $\frac{1}{24}$ part arsenic, in the case* referred to, should cause death in two days by combining with all the organic tissue?!

Insoluble compounds of arsenic *do* produce death — this Liebig denies, Orfila has proved it!

If arsenic combines with the albumenous and muscular matter in the stomach, how does it reach *every soft organ* of the body, the blood and the *urine!* Mr. Britten, of Dublin, lost his life in inhaling hydrogen, from $S O_3$ containing arsenic! did the minute quantity of gas inhaled (in a state of great dilution) chemically combine with the albumen and mucus membrane, and thus destroy life?

Can we argue merely *chemically* on *pathological* subjects? Are cause and result to be expected in the animal economy, or the action of disease to follow each other by the same fixed laws observed in the laboratory? If so, why have we *no* laboratory *precision*, why are not the results as unvaried and *definite?*

Surely arsenic is a *specific poison*, and not to be bound by the laws of chemical combination in its action on the animal economy.

Mr. Mercer said that Liebig's theory was supported by Müller, Bischoff, Sir R. Kane, and Sir B. Brodie, and having obtained so much credence in the highest circles, he thought it worthy of deferential consideration.

Dr. Inman thought that it was hastily written and confusedly expressed, and he doubted not a second edition of the work would show a considerable modification of Liebig's views. Nothing appeared to him more certain than that many medicines exercise a specific action on the system, without undergoing either *solution* or chemical combination.

Mr. Samuelson read a paper on Soda Ash.

Friday Evening, December 7th, 1849.

THE PRESIDENT IN THE CHAIR.

Dr. Brett resumed his lecture on Arsenic, and proceeded to illustrate the chemical tests used for detecting the poison.

These have been fully described on several occasions in this Journal. (See vol. i, pp. 277 and 511; vol. ii, pp. 123 and 180; vol. iv, pp. 133 and 349, &c. &c.).

At the conclusion of the lecture, Mr. Mercer remarked that he had repeated Dr. Brett's experiments with regard to the arsenical

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* The case alluded to is as follows: a girl died from the application of an arsenical paste to an ulcer of the breast. The preparation contained only one twenty-fourth of its weight of arsenic, it was applied only one night on a surface of an inch-and-a-half diameter. Death, with inflammation of the stomach, ensued within two days.

compounds mentioned in the last lecture. He took 100 grains albumen and one grain arsenious acid, and coagulated by heat; he boiled the coagulate in water, and could only get a small stain by Marsh's test; on decomposing the organic matter, the proof was abundant. He, therefore, thought that combination had taken place, though a trace of arsenic might be removed by boiling.

Dr. Brett said in reply, that if Liebig's theory meant anything, it at least meant this, that arsenic formed a compound in atomic proportion with albumen; and that albumen being in excess, *no agent* can abstract the acid, except by decomposing the organic matter. How, then, can even "a trace" of arsenic be dissolved out by boiling water? But it was *not* a *mere trace*, he had obtained abundance of it from his experiment, in which he only used one-quarter the quantity of arsenic which Mr. Mercer employed. Christison had taken the tissue of the stomach, and dissolved out *the whole* of the arsenic by continued boiling in water. What becomes of the chemical theory in cases where the effects of arsenic are continuous for four, five, or even six years?—was there an insufficiency of albumen to combine with the minute quantity of arsenic taken?

Mr. Waldie thought that the theory with reference to arsenic was founded upon analogy, and not upon direct experiment. Dr. Brett's experiments were perfectly satisfactory to his mind, and he thought they were conclusive objections to Liebig's views.

Mr. Walker then read a paper on the Sale of Poisons, in which he considered the proposals of the Medical Association, viz., 1st, A license; 2d, Mixture with colouring matter; 3d, A witness; 4th, Entry in a register. His objection to the first was, its tendency to lessen the responsibility on the part of the seller, and therefore diminish the precaution adopted; 2d, The difficulty of finding a suitable colouring matter; 3d, The uselessness of a witness, this being, in most cases, so easily obtained; 4th, the danger of false names and addresses.

His own proposition was, that its sale should be confined to Chemists and Druggists and medical men, or to other parties, by an order signed by a magistrate. These precautions he thought would check criminal poisoning, and altogether prevent accident.

Mr. Alpass thought the colouring of great importance, and that many fatal results would have been prevented by this precaution. He did not see why other poisons should not be dealt with as well as arsenic, oxalic acid, sugar of lead, laudanum, &c. He thought that they might be all restricted.

Mr. Waldie thought that no impediment should be imposed on the student of Chemistry, who constantly required poisonous preparations for the prosecution of his studies. Cyanide of potassium, hydrocyanic acid, bichloride of mercury, &c. may be frequently required in the arts, as well as in the laboratory, and he thought any restriction would be injurious, while it would not accomplish the objects sought.

Several members remarked that they never sold arsenic.

Mr. Evans said it was used in large quantities for glass manufacture, covering ship's bottoms, sheep-dressing, and also for wheat.

J. Thorburn, M. D. (Barrister) expressed his gratification at being present at such an interesting discussion. He had taken an active part in calling public attention to the subject, and was quite

convinced that the sale of arsenic was altogether pernicious, and ought to be legally restricted.

Mr. Walker *moved*, Mr. Rowland *seconded*, That in the opinion of this meeting it is desirable that the sale of arsenic be restricted to manufacturers, medical men, and Chemists. This resolution was carried by a large majority.

The Society then adjourned till February.

ON THE COMBINATION OF ARSENIOUS ACID WITH ALBUMEN.

BY J. DANSON, ESQ.

Albumen precipitates arsenious acid from its solution, forming with it a sparingly soluble compound. I took the white of a perfectly fresh egg, and mixed it with a large quantity of arsenious acid, triturated well for some time, then coagulated the mixture by heat. My product was a snow white substance, possessing an agreeable smell when washed with cold water, it gave no indications of arsenic, but boiling water took from it portions of the arsenious acid. After repeated washings with hot water, I found the filtrate gave no indication of arsenic. The residue on the filter was dried, and its organic matter *carefully* destroyed by *pure* sulphuric acid; the black acid fluid, when submitted to Marsh's apparatus, *gave large bright black* stains of metallic arsenic, a proof of the existence of the compound mentioned by Liebig.

Sir Robert Kane has mentioned in his *Elements of Chemistry*, and Dr. Muspratt has quoted this excellent authority in support of Liebig's view, that the compounds of "albumen with the acids is generally somewhat soluble; with metallic oxides insoluble." I find that chloride of mercury gives an *insoluble* compound with albumen. The mercury can be readily detected by destroying the organic matter. Christison mentions, "The dry precipitate I have found to contain six per cent. of metallic mercury." Is not this another proof of Liebig's observation? There is no surer proof of the formation of insoluble compounds than the following quotation from Dr. Taylor's work on *Medical Jurisprudence:* "If water should fail in extracting the poison,* the substance may be brought to dryness and heated with nitro-muriatic acid until all the original matter is decomposed, and the surplus acid expelled. The residue may then be digested in water, and tested for mercury." Moreover, one of the ablest Chemists in London, whose opinion has been asked on these matters, writes the following to Dr. Muspratt: "With respect to the action of the salts of Hg O, Pb O, and As O_3 on animal matters, I satisfied myself years ago; I have found them all capable of rendering albumen insoluble, and also of forming chemical compounds with it. I find upon trying the experiment with As O_3, as you suggested, that the albumen takes up a large quantity of As O_3."

College of Chemistry, Liverpool.

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* If water will not extract it, there must be combination.

ORIGINAL AND EXTRACTED ARTICLES.

ON TURNSOLE.

BY MR. DANIEL HANBURY, JUN.

Although the subject of these remarks may by some be considered more to concern the dyer than the pharmaceutist, I trust that taken in connexion with another substance well known to chemists, and often confounded under the same name, it may not prove altogether devoid of interest.

Turnsole, or Tournesol, is a name applied to two* articles of different origin. The one is the Litmus of English chemists (*Tournesol en pains* of the French), a blue substance imported from Holland, and believed to be derived from some species of lichen. The property possessed by its solution, of being changed by acids from blue to red, is its most important character.

The other species of Turnsole, and that on which I propose to offer a few remarks, is called Turnsole Rags (*Tournesol en drapeaux*). It is sold as pieces of very coarse hempen cloth, of a purplish black colour. Steeped in water (which readily extracts all the colour) we obtain a bright purple solution, which is reddened on the addition of an acid or of an alkali. The plant affording this colour is the *Croton tinctorium*, Linn., *Crozophora tinctoria*, Endl., and *la Maurelle* of the French. It is indigenous in the south of France, and has been cultivated for use since the year 1833, previous to which time the wild plants only were collected. The locality where the cultivation is carried on is restricted to the neighbourhood of the small town of Grand Gallargues, in the department of Gard.

According to J. P. Hugues, to whose pamphlet (*Une Excursion dans la Commune de Grand Gallargues, dans* 1835. Nismes, 1835), and a personal visit to the spot during the past autumn, I am indebted for most of these particulars, the plants, which vary from six to eight inches in height, and whose seeds are developed though not ripe, are cut in the month of August, ground to pulp in a mill, and the juice, which amounts to about half their weight, expressed. This juice is at first of a dark green colour, but speedily assumes a purple hue by simple exposure to the air. In it, the cloths (which are merely pieces of coarse sacking carefully washed) are soaked, dried, exposed to the vapour of ammonia derived from a heap of stable manure or some similar source, and immersed in another portion of juice with which a quantity of urine has been mixed. A second drying completes the process.

In this state the Turnsole is purchased by dealers, packed into large sacks, each capable of containing four quintals, and carried to the neighbouring ports, whence it is shipped to Holland.

But little is known of the purposes for which Turnsole is purchased by the Dutch. According to the author before quoted, its use is confined to colouring the exterior of cheese, though it was formerly

* The "Turnesol *in linen*" and "*in cotton*," of Pomet, being manifestly different preparations, and no longer objects of commerce, are excepted.

thought to have served in the manufacture of blue paper, the colouring of wine, confectionery, &c. Pomet, in common with other old authors, imagined it formed the colouring matter of Litmus, an opinion since entertained by Guibourt (*Histoire des Drogues Simples.* Paris, 1836), but relinquished in a subsequent edition of his works. Dr. Ure states the name Turnsole to have been applied to Litmus, in order to conceal the true origin of the latter substance.

The manufacture of Turnsole has been carried on in the south of France from an early period. Pena and De Lobel (*Stirpium Adversaria Nova.* Lond., 1570) correctly describe the plant and its locality, and mention its employment both in medicine and for dyeing. It is also described by Pomet, and figured in the English translation of his *History of Drugs*, printed in London in 1737. Pliny alludes to it under the name of *Heliotropion tricoccon.*

In conclusion, it may be observed as a curious fact, that although formerly in general demand, Turnsole Rags appear to have fallen into complete disuse everywhere but in Holland, in which country all that are now produced are consumed. Of the uses to which they are applied by the Dutch, we are still in want of more precise information.

Plough Court, Lombard Street.

ON THE COMMERCIAL VARIETIES OF TURMERIC.

BY JONATHAN PEREIRA, M.D., F.R.S.
Assistant Physician to the London Hospital.

Although in a medicinal point of view turmeric is of little value, and is scarcely employed as a remedial agent, yet as it is sold by Druggists, and is used for chemical, dietetical, and tinctorial purposes, it is necessary that the pharmaceutist should have a correct knowledge of it. Now, in no pharmacological or other works, whether British or foreign, with which I am acquainted, is there any general account of all the different commercial varieties of this root found in the London market, and I, therefore, venture to attempt to supply this deficiency. I am enabled to do this by the kindness of my friend Mr. Augustus Faber, who has been good enough to obtain for me the necessary authenticated samples.

In most of the older and many of the more recent works in which turmeric is described, two kinds of this root are mentioned, one called *long turmeric* (*curcuma longa*), the other termed *round turmeric* (*curcuma rotunda*). These two forms have been erroneously supposed to be the produce of two different plants; and Linnæus, who adopted the error, gave the name of *Curcuma rotunda* to the plant, which, as he was led to believe, yielded the *round* turmeric, and that of *Curcuma longa* to the plant which was thought to produce the *long* turmeric. But although there are many species of *Curcuma* (Roxburgh has described seventeen) there is no one which exclusively produces either long or round roots, both kinds growing on the same plant.

This fact has indeed been long known, for I find it mentioned in James's *Medicinal Dictionary*, vol. ii., art. "Curcuma," published in 1745; yet many persons have overlooked it, and even so well informed a writer as Guibourt, in the first edition of his *Histoire des Drogues*, published in 1820, fell into the error of supposing that these two forms of turmeric were the produce of two different plants.

Before proceeding, therefore, to the description of the commercial sorts of turmeric, it may be well to describe briefly the different parts of the root of curcuma.

Description of the Roots of Curcuma.—The subterranean parts composing the biennial roots of the genus Curcuma consist of four parts:

1st, A central tubercle, called by Rumphius the *mother-root (matrix radicis)*; by Roxburgh, the *bulb* or the *ovate bulb*. It is formed during the first year, and supports the aërial parts of the plant; hence it has been termed the *phyllophorous receptacle*. This central tubercle constitutes the *round turmeric* (*curcuma rotunda*) of the shops, and is usually called by dealers the *bulb*.

2dly, From the central tubercle there arise several lateral tubercles about the size and shape of the finger, and which, altogether, somewhat resemble the fingers of the half-closed hand. These lateral tubercles are called by Roxburgh the *palmate tubers*. They constitute the *long turmeric* (*curcuma longa*) of the shops.

3dly, Chiefly from the lower part of the central tubercle arise the rootlets, or *fibres*, as Roxburgh calls them, which constitute the proper or genuine root. Of these no use is made.

4thly, Some of the fibres composing the root are thicker than others, penetrate deeper into the soil, and terminate inferiorly in a single, olive-shaped, white or pearl-coloured, tasteless, amylaceous solid tubercle, called by Roxburgh the *oval* or *pendulous tuber*; it may be conveniently distinguished as the *amylaceous tubercle*, inasmuch as it abounds in starch, and is the only part of the curcuma root (*C. angustifolia* and *C. leucorrhiza*) employed in India for the preparation of curcuma starch, called *tikor* or *East Indian arrow-root*. These amylaceous tubercles form no part of the turmeric of commerce.

Description of the Commercial Roots called Turmeric.—The turmeric of the shops consists of the dried central and lateral tubercles; the central ones, commonly called *bulbs*, compose the *round* turmeric; the lateral ones, the *long* turmeric. The first are round, oval, or ovate, about two inches long, and one inch in diameter, pointed at one end, and marked externally with numerous annular wrinkles. The second are cylindrical, not exceeding the thickness of the little finger, two or three inches long, somewhat contorted, and tuberculated. Both kinds are yellowish externally, internally more or less orange-yellow, passing into reddish-brown. The fractured surface has a waxy appearance. The odour is aromatic, somewhat analogous to ginger, but peculiar; the taste is aromatic. When chewed it tinges the saliva yellow. Its powder is orange-yellow. The tubercles are frequently worm-eaten.

The central or round tubercles (or bulbs) contain less colouring matter than the lateral tubercles composing the long turmeric, and on this account they are sometimes picked out of samples and separately sold. Hence, I presume, has originated the mistaken notion that they are a distinct sort.

If a thin slice of turmeric root be examined by the compound microscope, it is seen to consist chiefly of rounded or oblong, yellow, readily separable cells or vesicles, which appear to be filled with a minutely granular matter, and to be contained in an hexagonal cellular tissue. Intermixed with these cells, are observed globules of a viscid, oleaginous, orange-coloured liquid (*curcumin?*) By boiling the slices in rectified spirit, the oleaginous liquid is dissolved, and the cells are

deprived of their yellow colour. The colourless cells appear still to be filled with a granular matter. On the addition of iodine, the cells, but not the hexagonal tissue, acquire a dark blue colour, showing their amylaceous nature.

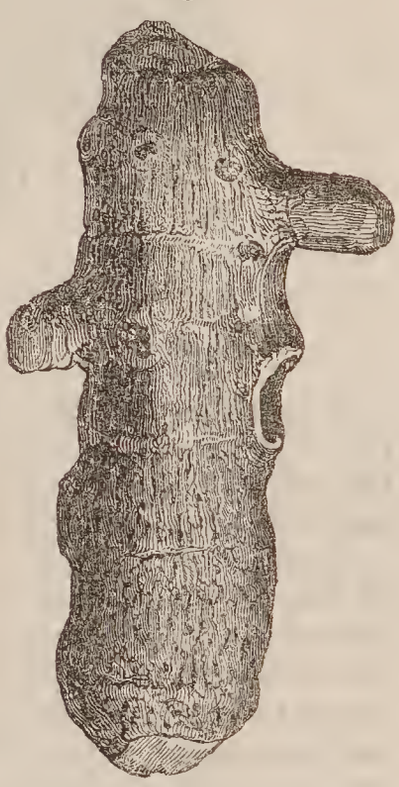
Varieties.—Five varieties of turmeric are known in the English market, namely China, Bengal, Madras, Malabar or Bombay, and Java turmeric. These are readily distinguishable from each other by their external appearance, but if they were sorted according to their resemblance, they might be arranged in three groups, thus :—

Group 1.	*Group* 2.	*Group* 3.
China turmeric	Madras turmeric	Bengal turmeric.
Java turmeric	Malabar turmeric	

1. *China turmeric.*—This sort consists of smooth, plump, round, and long tubercles, (*curcuma rotunda et longa*, figs. 1 and 2) of a greenish yellow hue externally. They yield a bright powder, and on that account are much preferred for medicinal purposes. Hence they fetch a higher price than any other sort of turmeric. Probably, if much of this sort were brought to market, it would not fetch more than the Bengal sort.

Fig. 1.

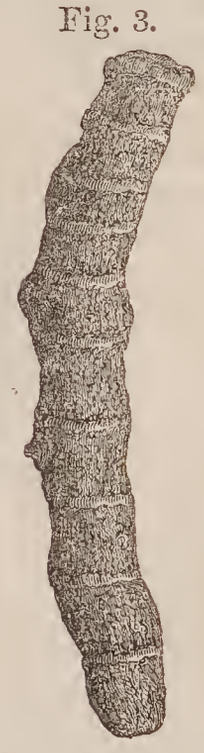
Fig. 2.



China Turmeric.

2. *Bengal turmeric.*—This sort consists of thin or narrow long tubercles (*curcuma longa*, fig. 3) which are moderately smooth externally and of a greyish dull yellow colour. They break with a deep reddish fracture. Although from the dull appearance of its narrow tubers it is not a very inviting sort to the inexperienced eye, yet it usually fetches a higher price than the Madras sort, on account of its being a much stronger dye.

Fig. 3.



Bengal Turmeric.

3. *Madras Turmeric.*—This is the most showy of all the kinds of turmeric. It consists principally of large long tubercles (*curcuma longa*, fig. 4), but mixed with transverse segments of round tubercles (*c. rotunda*, fig. 5). Externally, the tubercles are marked by longitudinal wrinkles, the surface of which is rubbed and bright yellow ; internally the colour is that of a fresh fractured surface of gamboge.

Fig. 4.

Fig. 5.

Madras Turmeric.

4. *Malabar Turmeric; Bengal Turmeric.*—This sort is not constantly found in the market. It consists principally of long tubercles (*c. longa*, fig. 6), the round tubercles (*c. rotunda*) being few and of very inferior quality. This sort of turmeric is smaller and more shrivelled than the Madras sort, but otherwise somewhat resembles it.

Fig. 6.

Malabar Turmeric.

5. *Java Turmeric.*—Not frequently found in the English market. In a general way it may be said to resemble the China sort. It consists of both round and long tubercles (*c. rotunda et longa*), but chiefly the latter, fig. 7. They have a greenish yellow hue.

Fig. 7.

Fig. 8.

Java Turmeric.

Under the name of *bulbs of Batavian turmeric* I have received a sample of round tubers (fig. 8) said to be from Java. Dr. Th. Martius notices this sort as having been brought for many years from Batavia, and adds, that it contains much colouring matter, and is probably the produce of *Curcuma viridiflora*.

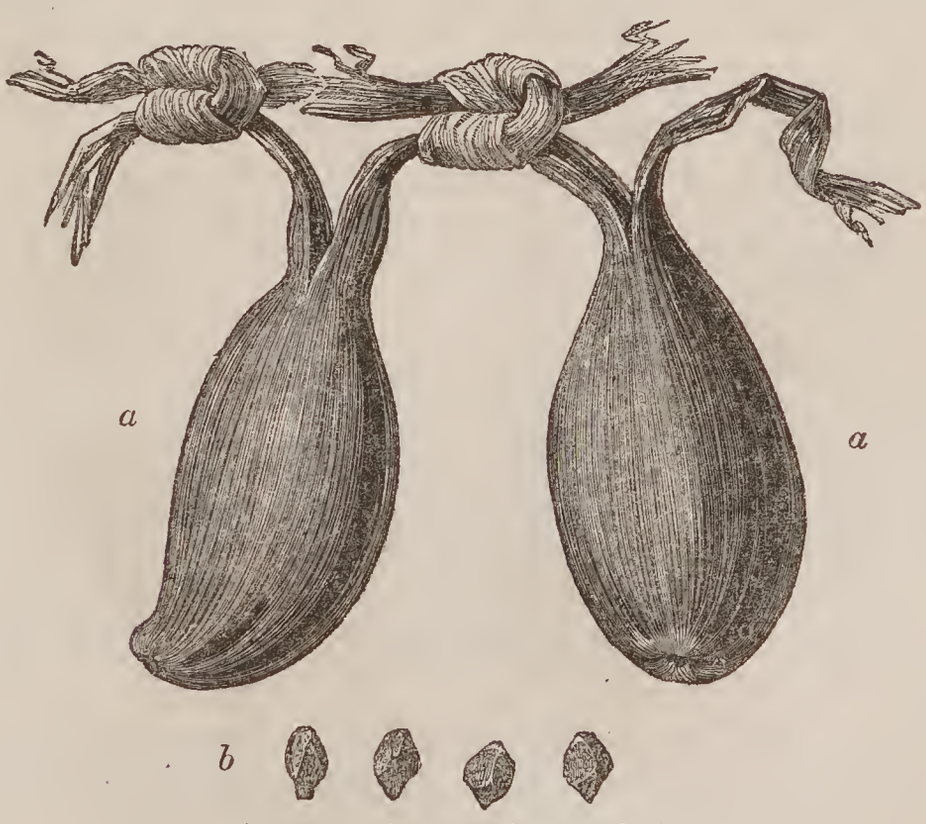
In order to give a correct notion of the relative commercial values of these various sorts of turmetic, I have endeavoured so ascertain their present Mincing Lane prices. I find, however, that there are not just now (Dec. 21, 1849) any China or Java turmeric in the market; and the prices of these sorts, therefore, must be nominal.

China and *Java.*	*Madras.*	*Bengal.*	*Malabar.*
(First sort.) (First sort.)	(Good to fine.)	(Good)	(Good.)
25*s.* 15*s.*	15*s.* to 16*s.* 6*d.*	14*s.* to 15*s.*	14*s.*
Nominal.			

ON THE AMOMUM CITRATUM, AN UNDESCRIBED SPECIES OF LARGE CARDAMOM.

BY JONATHAN PEREIRA, M.D., F.R.S.,
Assistant Physician to the London Hospital.

In previous numbers of this Journal (see *Pharmaceutical Journal*, vol. ii, pp. 384 and 443; and vol. vi, pp. 412 and 466) as well as in my *Elements of Materia Medica*, I have drawn attention to the confusion which existed among previous writers with respect to the substances intended to be designated by the terms *cardamom* and *grains of paradise*. The object of the present paper is to notice a scitamineous fruit which I have reason to believe has been used in medicine in England, and perhaps is still employed in some countries, under the name of *larger cardamom* or *Cardamomum majus*, but which differs from all other described sorts of cardamoms with which I am acquainted.



Amomum citratum (natural size).
a a The capsules. *b b*. The seeds.

In my *Elements of Materia Medica* (1st ed. p. 699 ; 2d ed. p. 1036) I have briefly noticed, under the name of *Cardamomum majus*, a fruit which I found in Dr. Burgess's collection at the College of Physicians in London. Although I recognised it as a sort distinct from other described cardamoms, the specimen was in too bad a state of preservation to admit of any satisfactory description of it.

More recently I have found several specimens of the same fruit in the Sloanian collection of the British Museum. They are tied together in bunches. One sample is un-named, another is marked in the catalogue, "12057, *Grana Paradisi.*"

I have also met with the same fruits in a collection at Apothecaries' Hall, and I am indebted to Mr. Warrington for the specimen here figured, and which, for reasons presently to be stated, I propose to name provisionally *Amomum citratum.*

In Dr. Burgess's collection, the fruit is called *Cardamomum majus ;* in the Sloanian collection it is termed *Grana Paradisi.* It is probable, therefore, that it has been confounded with the latter fruit. Now, Valerius Cordus (*Hist. Stirpium*, lib. iv, p. 195, 1561) has described, under the name of *Cardamomum majus*, a fruit which he states has been mistaken for melligetta. He says it is smaller than melligetta, and turbinate like a pear. These properties apply to the *Korarima* or *Abyssinian cardamom* (see *Pharmaceutical Journal*, vol. vi., p. 466) but scarcely to the fruit, which is the subject of the present paper.

The *Cardamomum majus* of Bontius (*Hist. Nat.*, p. 127) is probably the Ceylon cardamomum (*Eletteria major*, Smith in Rees's *Cyclopædia*, vol. xxxix). The *Cardamomum majus vulgare* of Clusius (*Exotic*, lib. 1, cap. xxiv) and of Parkinson (*Theatrum Botanicum*, p. 1576) is certainly the Ceylon cardamom. The *Cardamomum majus officinarum* of Caspar Bauhin (*Pinax*, p. 413) includes both the *Cardamomum medium* of Matthiolus, which is the Ceylon cardamom, and the *Cardamomum majus* of Corda, which, as I have above stated, is the Abyssinian cardamom.

I am, therefore, unable to identify Dr. Burgess's fruit with any previously described sorts of *Cardamomum majus.*

Of all the scitamineous fruits with which I am acquainted, this is the only one which I have met with tied together in bunches in the manner represented in the accompanying figure. The red colour of the fruit also serves to distinguish it, as well also as its shape, which is represented in the wood-cut.

But these fruits are most readily and certainly distinguished from all other sorts of cardamom by the seeds. These are angular, oblong, larger than those of Malabar cardamoms, shining brownish-yellow, and have a large concave depression (*hilum*) at one extremity. They have a warm aromatic flavour, somewhat analogous to that of the oil of lemon-grass (*Andropogon citratum*, De Candolle). When crushed, they evolve the odour of this oil. By this flavour and odour they are instantly distinguished from all other scitamineous fruits which I have hitherto met with under the names of *cardamoms* or *grains of paradise.*

Although it is of course impossible to speak precisely as to the genus to which this fruit belongs, various circumstances lead me to believe that it is a species of *Amomum*, and I propose, therefore, to call it (provisionally) *Amomum? citratum.*

ON THE COMPOSITION OF THE TITANIUM CRYSTALS WHICH ARE MET WITH IN THE SLAGS OF THE BLAST FURNACES.

BY PROF. WÖHLER.

It had hitherto been believed that the cubic crystals of titanium, which occur pretty frequently in the slags of the blast furnaces, were metallic titanium ; I have just discovered that these cubes are formed of cyanuret and of nitruret of titanium. They contain eighteen per cent. of nitrogen and four per cent. of carbon, and are represented by the formula $Ti\,C_2N + 3Ti_3\,N$ or $(TiCy + 3Ti_3\,N)$. I have likewise found that the titanium obtained by the method of Prof. H. Rose is a nitruret of titanium containing twenty-eight per cent. of nitrogen, and with the formula $Ti_3\,N_2$.

The cubic crystals, fused with hydrate of potash, furnish ammoniacal gas. The same crystals, heated in a current of chlorine, yield a liquid chloride of titanium and a very volatile crystalline substance, which is a combination of cyanide and of chloride of titanium. This latter substance may be obtained directly by placing chloride of titanium in contact with some gaseous chloride of cyanogen. The gas is absorbed without disengagement of heat.

By heating the cubes to redness in a current of steam, the latter is decomposed and hydrogen obtained, as had been previously announced by M. Regnault ; but there is moreover produced some ammonia and some hydrocyanic acid. The titanic acid which remains exhibits the same octahedral form as anatase ; it is artificial anatase.

I have succeeded in forming the cubic crystals by heating in the forge-furnace a mixture of titanic acid and ferrocyanide of potassium. With respect to the simple nitruret, it is very easily obtained by heating to redness titanic acid in a current of gaseous ammonia, cyanogen or hydrocyanic acid. This substance always occurs with a remarkable metallic lustre.

I have been able by the same process to obtain the nitrurets of several other metals, which I am at present engaged in examining.—*Comptes Rendus*, Nov. 5, 1849, and *Chemical Gazette*.

NOTES ON HEATING AND VENTILATING.

COMPILED FROM THE UNPUBLISHED MSS. OF THE LATE BRIG.-GEN. SIR SAMUEL BENTHAM.

In Sir Samuel Bentham's description of his design for the Dockyard at Sheerness, he specified as one of the objects he had in view, "a more uniform attention to the arrangement of fire-places, fire-flues, and chimneys," and "the introduction of air by doors and windows, in a manner the least annoying to the persons within." Details of the improvements he projected under these heads have not been found ; but as he had, for a long series of years, investigated the different modes of heating and ventilating buildings of all descriptions, the following compilation from his notes and observations on the subject may not be without its use.

In regard to warming and ventilating large buildings, very good contrivances have already been introduced. The apparatus lately erected in the Middlesex Hospital, for instance, is said to be remarkable both for its efficiency and its economy. The present suggestions are, therefore, confined more particularly to private habitations,—a description of buildings respecting which the many attempts that have been made, to economise heat and to ensure good ventilation, seem to have proved failures

in some respect or other. This want of success in a matter which so materially affects our health, our daily comforts, and our purses, seems to have arisen from a want of attention to our habits, as much as from neglect of sometimes one, sometimes another of the desiderata. Air unpolluted from the exterior, still more the blaze of a cheerful fire, are enjoyments which in this country are ill dispensed with ; chief objects, then, are those of admitting fresh air so as not to injure health from sudden draughts, and of giving heat from an open fire, yet so as to consume little fuel, and with as little waste of heat as possible.

Exposure to currents of air is perhaps the most frequent cause of common colds, as well as of the more serious diseases of the respiratory organs. Some seventy or more years ago, the late Dr. George Fordyce remarked, that amongst persons who attended at his house for gratuitous advice, there were at times nearly the whole of the many men employed at Brodie's manufactory of fire-grates,—these persons being usually affected with coughs and symptoms of inflammation of the chest. His curiosity was excited; he visited the manufactory, and found that air was admitted to it by louvre boarding, but so arranged that the cold air, in entering, was thrown down immediately on the men. The direction of the boards was, at his suggestion, reversed, so as to throw the cold air, on entering, upwards; consequently, by mixing with the hot air of the factory, the supply was warmed before it descended on the men; and, happily, their extraordinary liability to disease was arrested by this salutary though slight alteration. In St. Thomas's Hospital he, on the same principle, caused a strip of board to be so fixed along the upper part of the window sashes, as that when they were a little drawn down, the air should in like manner be directed to the ceiling, and warmed before its descent on the patients; this, though so simple and partial a contrivance, was attended with marked benefit to the sick. In the manufactory of the Messrs. Strutt, at Belper, besides their most efficient apparatus for warming the factory with heated air, their windows were arranged so as to admit, when desirable in winter, a limited quantity of cold air at pleasure, without injury to the operatives. One pane of glass in the upper part of each window was inserted, not perpendicularly, but inclined inwards at an angle of nearly sixty degrees; it was framed and lined, the sides of it were closed in with glass, a slide was fitted to the top in such manner as that the opening might at pleasure be more or less closed; thus the cold air was thrown, as in the former instances, to the ceiling, instead of allowing a draught to rush upon the people.

On speaking of the factories of these gentlemen—models of order and comfort as regarded the operatives—it may not be irrelevant to mention a very important particular influencing the health of the people employed in factories. The Messrs. Strutt had ascertained that the most advantageous degree of heat for work-rooms is 60° of Fahrenheit. At lower degrees it had been found that the fingers of the people became too much benumbed for work to be done either well or expeditiously, whilst at higher degrees it was evident that the operatives were enfeebled, became pale and emaciated, —not that a degree or two more or less made any material difference, but the degree fixed on to be kept to as nearly as possible was 60° Fahrenheit. This coincidence with the degree considered at St. Petersburgh as the most healthful for apartments in private houses, is remarkable ; 12° of Reaumur is there esteemed the most conducive to health, and 12° of Reaumur is about equal to 59° of Fahrenheit. Many rooms, it is true, are usually kept up to 14° Reaumur, nearly 64° of Fahrenheit, and some of the peasants' houses still higher at St. Petersburgh, but with bad effect on health, even where the amusements and employments are sedentary. On visiting afterwards the great fabric of Mr. Lee, at Manchester, where much had been done in the way of improvement, Sir Samuel found that

the degree of heat maintained in the work-rooms there was 70° Fahrenheit, and that there the baleful effects of this high temperature was apparent in the countenances of the operatives; but this great heat was thought advantageous in facilitating several of the operations in spinning the cotton, and the well-being of the people employed was seldom at that time so studiously eared for as it habitually was by the Messrs. Strutt.

Considering the usual structure of our houses, some modification of the above-mentioned means of throwing cold air on its entrance up to the ceiling, seems easy of introduction. Inside shutters would, in many houses, preclude the use of projecting panes of glass, as at Messrs. Strutt's; but there are few cases where a strip of wood, in the manner of that at St. Thomas's, might not be introduced. It might be made more or less ornamental, might be so contrived as to direct the cold air against the ceiling behind the cornice of the window-curtain, thus providing for ventilation in evenings after the curtains are drawn, as well as by day; but whatever the modification of the apparatus, besides being simple, it should be so contrived as that the quantity of air admitted should be easily regulated, and it should not be in the way of throwing open windows in the usual manner.

The introduction of air in the proposed way seems particularly desirable in those cases, unfortunately so common, where a door or a window must be a little opened to prevent smoke; it is generally applicable for supplying the air requisite for combustion of fuel in common fires, instead of allowing that air to enter as usual through vacuities in the fitting of doors and windows. Air direct from without would be more healthful and agreeable than that which had first travelled up the staircase, perhaps from the kitchen and offices, bringing with it the odours usual in those localities.

Admission of fresh air being thus provided for, that which is vitiated must have the means of exit furnished for it. This could hardly be otherwise so easily effected as by the usual chimney, up which, if tolerably well-constructed, the heated air of a room constantly ascends, though there be no fire. It may be said that a down draught, so frequently occurring, and so annoying, militates against this mode, but that inconvenience arises from insufficient admission of air to some other part of the house, so that sometimes air comes down a drawing-room chimney to feed the kitchen fire. The remedy is easy, partly by insuring a due supply of air to every part of a house where needed, and partly by a good construction of the tops of chimney shafts.

Some old engravings of houses at Venice show the chimney-pots of a different form from those in use here; the Venetian ones are enlarged funnel-wise at the aperture. Ventura's and Vince's experiments proved that the flow of liquids was the most considerable where the aperture of the pipe was enlarged funnel-wise, and the exit of all elastic fluids would probably, in like manner, be facilitated by a similar form of opening of the tube. In the low situation of Venice, experience may have led to a practice, the *rationale* of which remained for the science of after-times to discover.

The next point of consideration is that of warming apartments by means of air more or less heated beyond the temperature of the atmosphere. Very many contrivances have been introduced for this purpose, most of them too complicated, too costly, or requiring too much attendance to render them available for moderately-sized or small dwellings. In some cases, as in the Franklin stove, it has been only attempted to economise heat, by using that which would otherwise be lost to warm the air of the room; this he effected by fixing the fire-grate in a case of metal, placing that case in the usual fire-place, so that the air of the apartment might pass round it, being prevented by the setting of the stove from going up the

chimney. The so-called Prussian stove is on the same principle. Both of them economise heat at the same time that they afford the pleasures of an open fire; but still cold air must enter the room to supply the fire, although not in sufficient quantity for healthy respiration where many persons are assembled. The distinguished Chemist, Cavendish, towards the end of last century, contrived a stove, which in practice has been found to produce perfect ventilation, with a most agreeable temperature of the apartment, and with but a very small expenditure of fuel for a brilliant open fire. His fire-grate, with polished bars, was set in fire tiles which formed a casing like that of metal usual in register stoves, and in like manner it was constructed in the usual fire-place; but the outer dimensions were such as to leave a vacuity at the sides of, and behind the case; the vacuity was closed in at the top with tiles, and in front ornamentally with metal or marble. The opening above the fire-grate was the whole length of it; this aperture closeable more or less at pleasure by a plate of metal, eight or ten inches broad, inclined forward, and worked tight at the ends of it. The vacuity around the case was an air-chamber, having its supply pipe laid under the floor to the outside of the house, and a delivering pipe opening into the apartment from the upper part of the air chamber. This arrangement has perhaps never been equalled for simplicity, neatness, economy of fuel, due ventilation, and the attainment at will of any desired temperature, with the pleasure of an open fire.

Very many fire-places have from time to time been arranged on this principle, yet it has never become of general practice, and this most probably on account of a source of occasional failure which has not been adverted to, namely, that its *uniform* success depends on the points of the compass from which the wind may come. Suppose, for example, the supply pipe to enter from the west side of a house, then, with all winds from about south by west to about north, the disposition of the air would be to enter the supply pipe from *without*, so as to be delivered within the apartment; but with winds from the south by east to the north, air would be disposed to enter at any openings northward, and to drive the air from the heated chamber out of doors to the westward. This inconvenience has not been found to take place with moderate winds, but in violent ones it has amounted to a total reversal of the effect of the ventilating apparatus. But this derangement seems capable of being provided against.

The excellence of Mr. Cavendish's fire-place had been noticed by the great French chemist, Monsieur Berard; he copied it first in his own house at Montpellier, then in the houses of several friends, and always with success; but this depended, it would seem, on a particular which indicates a modification of the apparatus, which should be observed in English houses. French houses, usually so much larger than ours, have generally speaking, long corridors, open at both ends, on their basement floors. Monsieur Berard, instead of taking his supply of air from without, obtained it internally from one of these corridors, so that from whatever quarter the wind might blow, the supply to the air-chamber was uniformly the same. There was, however, one attendant inconvenience—the air was liable to be less pure than that of the external atmosphere.

Experience, therefore, has proved that on this principle the advantages are obtainable of perfect ventilation, by air of an agreeable temperature, combined with the pleasantness of an open fire, and the smallest loss of heat compatible with that comfort; it is a cleanly arrangement, either neat and cheap, or more or less ornamented. What remains to be contrived is, the mode of regulating the entrance of the air according to the wind. Suppose, for instance, that in the basement story of a house a small air chamber or pipe were provided, communicating with the open air by two separate pipes, these pipes having their apertures respectively

on opposite sides of the house; by such an arrangement alone, air would enter from the side on which the wind might happen to blow; other pipes leading from this general chamber might be carried to as many of the apartments as desirable, and the rarefication of the air, by the heat of the fire, would ensure a constant current upwards. Where thought worth while, the arrangement might be rendered perfect by means of an internal valve in the general receiving chamber, so as to close one end of it or the other, according to the wind. These valves might be self-acting, by means of a rod of metal connecting them with a vane on the top of the house.

There is, however, one point which seems to call for investigation as to this mode of ventilation, in common with all other modes where the air is heated. In certain states of the atmosphere, it is well known that on being heated, the capacity of air for absorbing water is greatly increased, so much so as to become injurious to health, by taking up moisture from the skin; this mischief has been particularly noticed in the use of Arnott's stoves, and has been remedied by keeping a dish of water constantly on the stove; and might be easily provided against in Cavendish's mode, by placing, where needful, a vessel of water in the air chamber. "Where needful" is said, because in this climate, times of frost excepted, it rarely happens but that the external air requires, for healthfulness, to be dried.

In the construction of new houses there seems much room for improvement of the fire-flues, especially in habitations for persons of a description who would consider economy of fuel a recommendation. Even where, as in the above-described air-chambers, much of the heat from open fires is utilized, still there is considerable waste of it up the chimney. To obviate this loss, the outline of an arrangement was devised for at least second and third-rate houses, in Sir Samuel's projected new town at Sheerness. It was, instead of brick chimneys in the usual way, the substitution, for each shaft, of a metal pipe, inserted in another of earthenware; these pipes to pass side by side successively, from room to room above, not enclosed by any permanent wall or other concealment; but screens were to be provided ready to shut off the heat they would communicate, whenever that might be wished. In the drawing-room of the Governor of Carlscrona, the stove was a column, with its appropriate base and capital, of the usual white glazed ware with which stoves are faced in Sweden and Russia; it was highly ornamental, and considering the superiority of our pottery, chimneys of this material might be beautiful.

Few houses are exempt from the evil of smoky chimneys; yet though there be contrivances of cowls, and differently-shaped pipes to remedy it (several of them effectual for a single shaft), it rarely happens that there is room to place more than one of these additions, on account of their projections. In some manufactories the shafts from several fires have been united in one at the top, and have been then surmounted by a cowl. Has this expedient ever been tried for private dwelling-houses? If so, with what success? And how was the down draught from one chimney to another prevented?

The manner in which many of the buildings of Sheerness were to be constructed, afforded opportunity of introducing, as Sir Samuel specified, "cool air in some cases from places underground," in the manner of the *ventaroli*, frequent in some parts of Italy; but in this climate a luxury of the kind seems hardly worth consideration for private houses, however advantageous it might be in several manufactories where the workmen are exposed to excessive heat.—*Mechanics' Magazine.*

NEW PROCESS FOR DETECTING AND ESTIMATING CINCHONINE IN COMMERCIAL SULPHATE OF QUININE.

BY M. O. HENRY.

In order that the medical profession might be certain of the effects to be produced by this valuable medicine, I was compelled to resume a series of experiments with a view of ascertaining an easy and inexpensive mode of analysing all sulphates of quinine suspected of containing *cinchonine** or its sulphate.

The process I am about to describe is founded on the characteristics announced by the authors of the discovery, MM. Pelletier and Caventou, namely, the great difference of solubility in cold water between acetates having quinine for their base, and those having cinchonine. I have already, in a notice published by me on this subject, made use of this property; but in the process about to be described the means adopted are much quicker and quite as certain in their results.

154 grains of the sulphate suspected of being adulterated are to be taken from a portion which has been thoroughly mixed;† 60 grains of acetate of baryta are to be added, then triturated very carefully in a porcelain mortar with 924 grains of pure water, to which a few drops of acetic acid have been added. This mixture in a few moments becomes a thick mass, of which a large portion is soft and acicular. This mass is to be carefully removed with an ivory knife and placed on fine cloth or thin flannel, and then rapidly pressed. The liquor obtained by expression is then to be filtered through paper into a flask; then doubled in volume with alcohol of sp. gr. .838,‡ after having filtered it again with a slight excess of sulphuric acid.

A decided excess of caustic ammonia is to be added, and the mixture then boiled for a moment. The ebullition soon causes the formation and separation of flakes, which, when viewed in a strong light, are brilliant and crystalline. These flakes, when existing in considerable quantity, soon precipitate, and produce an acicular crystalline deposit formed of

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* I will, in a few lines, mention the methods of detecting the greater number of substances which are sometimes met with in sulphates of quinine.

1st. By means of hot alcohol of sp. gr. .920 sulphate of quinine is isolated; that is to say, from cinchonine, gum, fecula, flour, the sulphates of lime, of soda, and of magnesia, phosphate of soda and calcined magnesia.

2nd. Cold alcohol of sp. gr. .838 separates the sugar to a great extent; which dissolved in water and evaporated yields caramel by the application of heat.

3rd. On adding to the sulphate of quinine a sufficient quantity of baryta-water, mannite, if present, is obtained in the liquor.

4th. Acidulated-water leaves any fatty acids intact, or the crystallizable resins.

5th. The addition of a few drops of sulphuric acid is sufficient to detect salacine and phloridzine; a mixture containing one per cent. assumes a poppy-red tint.

6th. An excess of water of crystallization would be indicated by estimating the loss on carefully drying the specimen: it ought not to exceed 10 per cent. That prepared by myself contains 8 per cent.; but in commerce it very frequently exceeds 15 per cent., which makes a great difference in an article of such a high price as sulphate of quinine.

† I recommend this precaution on account of the deception frequently practised of placing the first and finest crystals round the inside of the bottles where they are seen, while the middle part is filled with the produce of the third and fourth crystallization, or with sulphate of cinchonine.

‡ In this method all the cinchonine in the state of acetate is accumulated by eliminating the greater portion of the quinine, which is very important; as, when the cinchonine is precipitated by ammonia, if it is nearly pure, the deposit is clear and crystallised; but if there is much quinine it is viscous and resinous, and contains a portion of the last-mentioned organic base.

pure cinchonine. The liquor is to be allowed to partially cool, and the crystals or grained deposit carefully collected on a filter, the weight of which has been previously ascertained; then, after quickly drying the precipitate at a proper heat, the quantity is to be weighed, which represents at least a seventh or eighth part of the sulphate of cinchonine existing in the quinine. The alcholic liquor collected separately yields, after evaporation, acetate of quinine. In this manner we may, in a short time and without loss, effect a perfect examination of the suspected sulphate.

In cases where a fifth, tenth, and a twentieth part of cinchonine has been mixed with the pure sulphate of quinine, I have, by the above process, arrived at very approximate results, although generally indicating less than the quantities present.

Without seeking to make any comparison with other sulphates of quinine, the purity of which can now be tested, I may state that the products of our manufactory are so identical, that ten analyses have not yielded more than one and a half or two per cent. of cinchonine.

In the wholesale manufacture of sulphate of quinine, it is almost impossible to avoid the natural admixture of cinchonine to the extent of one or two per cent.; consequently, when it extends to ten per cent., it may be considered as having been added for the purpose of adulteration. A process of M. Liebig's is employed in commerce for the testing of sulphate of quinine, which I will now describe, having used it with success for the purpose of comparison with the one just spoken of above. M. Liebig's process consists in taking one gramme (15.4 grains) of sulphate of quinine chosen from a number of specimens, triturating this salt in a porcelain mortar with 60 grammes (924 grains) of pure ammonia, then pouring 60 grammes (924 grains) of sulphuric ether into a bottle with the milky liquid; the bottle being well stopped it is to be shaken several times, then left in repose. The quinine is dissolved in the ether with a sensible trace of cinchonine.* The largest portion remains in the form of white crystalline flakes or in crystalline powder, floating between the two layers of ethereal and ammoniacal liquids. The weight may be approximatively estimated by the eye, or by comparison with a test solution prepared for the purpose.

This process, although very ingenious and of easy execution, has one inconvenience, that of rendering it difficult to collect with exactitude the separated cinchonine, in order to ascertain its weight and estimate its true character. Furthermore, there is the price of ether to be considered, for we cannot easily operate on 5 or 10 grammes of *sulphate* without using 300 or 600 grammes of sulphuric ether. This objection might be removed by resorting to distillation. In the process I have proposed, 10 and even 20 grammes of salt may be easily operated upon, in which case there is much more certainty of having an uniform specimen, and the cinchonine may be easily collected for separate examination.

I have made some slight modifications in the process above described, which ought to be mentioned here as the completion of the notice. They are as follows:—

Four grammes (60 grains) of sulphate of quinine are introduced into a glass flask after having been triturated with a slight excess of caustic soda or ammonia. The decomposition of the organic salt being effected, the sulphuric ether, which is to be boiling, is then to be added by degrees; the clear liquid is to be filtered whilst warm; the insoluble residue again treated with distilled water for the purpose of dissolving the sulphate of soda or of ammonia which may have been formed during the

* For 1 gramme (15.4 grains) of pure sulphate of cinchonine treated by this method has left dissolved in the ether a sensible quantity of the organic base, which is found crystallised after the spontaneous evaporation of the liquid.

operation,* and that which remains insoluble is the cinchonine. It is then, whilst warm, to be treated with rectified spirit, which, after evaporation, furnishes that crystalline base with the known characteristics. Pure sulphate of cinchonine treated in this manner has also left about an eighth part of its base in solution.

The sulphate of quinine prepared by myself only produced one and a half per cent. of cinchonine as by the other process. This same sulphate of quinine mixed with a tenth part of sulphate of cinchonine, yielded nearly the whole of the cinchonine added. By taking the necessary precautions, the process by sulphuric ether affords similar results, and is a very exact mode of comparison ; but it requires a greater length of time in its operation, and a considerable quantity of sulphuric ether is requisite to be certain of the perfect solution of the quinine, or if a large quantity is operated upon.

After the filtration of the ether the solution of quinine forms at the bottom of the vessel a dense and yellowish liquid, and by spontaneous evaporation of the solvent the quinine is obtained in the form of a soft transparent resin.—*Journal de Pharmacie.*

ON QUINOIDIN AND β-QUININE.

BY J. VAN HEIJNINGEN.

The following investigation was undertaken with the quinoidin imported into Holland. It is soluble in ether, leaving a residue varying with the different sorts from twelve to fifteen per cent., also in acids and alcohol. It neutralizes the acids, and burns with an agreeable odour almost without residue. The elementary analyses of the whole mass gave unequal results, the carbon and nitrogen amounting always to a greater proportion (to one per cent.) the more easily it dissolved in ether. Such quinoidin consists of a mixture of at least four to five substances, viz., 1. Quinine (now called by the author *α-quinine*); 2. Cinchonine ; 3. A base of peculiar properties, called by the author *β-quinine;* 4. A resinous colourless substance, which readily becomes brown in the atmosphere. The quinoidin was treated in three different ways.

1. *Method.*—100 grammes of quinoidin were treated with the smallest possible quantity of ether, and the brownish-yellow solution separated from the blackish-brown residue of about fourteen grammes. The solution can be decolourized by animal charcoal directly, or in order to save the ether, the latter is distilled off, the residue dissolved in sulphuric acid, and this solution treated with animal charcoal. The decolourized liquid is precipitated by ammonia, and the washed precipitate dissolved in ether.

The ethereal solution, in whatever way obtained, was then mixed with one-tenth of its volume of alcohol of ninety per cent., and allowed to evaporate spontaneously in the cold atmosphere. The greater part of the liquid having thus evaporated, a large quantity of crystals of the above-mentioned β-quinine were discovered at the bottom, and were then washed with alcohol.

The alcoholic liquid, poured off from the β-quinine, was again evaporated and perfectly saturated with sulphuric acid, and the remainder of the alcohol separated by evaporation. The solution having become cold, crystals of β-quinine, very similar to sulphate of quinine, precipitated from it. The mother liquor yielded a quantity of these crystals, intermixed with crystals of common sulphate of quinine, and at the same time it contained a dark brown substanee.

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* The treating with water is indispensable to isolate the sulphates of ammonia and soda, as, without this precaution, they might be taken for cinchonine.

The crystals of β-quinine were now collected and purified by recrystallization from boiling water. The common sulphate of quinine was separated by dissolving the crystals with a few drops of sulphuric acid in cold water, precipitating the solution by ammonia, washing, and drying the precipitate, and dissolving it in spirit of wine of ninety per cent. This solution was slowly evaporated, by which the β-quinine was crystallized, whilst the α-quinine or common quinine remained dissolved in the alcoholic solution.

The dark brown resinous residue which the ether leaves behind was dissolved in diluted sulphuric acid, decoloured by animal charcoal, and precipitated with ammonia. The dried precipitate was dissolved in hot alcohol and allowed to crystallize. In this portion of the quinoidin the cinchonine is contained. This is now gradually precipitated, whilst the brown colouring substance remains in the solution.

2. *Method.*—According to Winckler's method, 100 grammes of quinoidin were dissolved in ether, the solution decolourized by animal charcoal, and the ether separated by careful distillation. The yellow resinous substance which remained behind was carefully neutralized with diluted sulphuric acid, and the solution evaporated by a gentle heat, when cold crystals were formed.

These crystals have been erroneously considered by Winckler to be sulphate of quinine ; but they are sulphate of β-quinine, with a trifling admixture of the former. The liquid being removed from them, it was evaporated, till no more crystals separated. It was then dissolved in water and decolourized. This solution when precipitated with ammonia, yields, according to Winckler's opinion, pure quinoidin or amorphous quinine.

If, however, the thus obtained precipitate, after having been well dried, be dissolved in ether mixed with a small quantity of alcohol, and the solution allowed to evaporate spontaneously in a cool and dry place, crystals of β-quinine are also obtained. The remaining liquid can then be saturated with diluted sulphuric acid, and the alcohol evaporated, when, as in the first method, a large quantity of β-quinine crystallizes when the liquid becomes cold, and the rest of the liquid solidifies at last, after continued evaporation, into *a paste of crystals.*

By this second method, the same results are obtained as in the first, only at a greater expense of material and time, for by the influence of acids and heat, and, as it seems, by the presence of a colourless substance, which becomes in the atmosphere brown and resinous, the β-quinine becomes gradually decomposed, so that another decolourization must be performed, since these products of decomposition prevent the crystallization of the still dissolved β-quinine.

3. *Method.*—100 grammes of quinine were dissolved in diluted muriatic acid, the solution decolourized by animal charcoal, and precipitated with ammonia. The precipitate, which at first was white and flaky, contracted soon into a resinous cake, which became brown in the atmosphere.

This having been well washed and dried, was dissolved in alcohol of ninety per cent., and the solution evaporated. In the rather deep-coloured cold solutions, crystals were formed. These appeared to be pure cinchonine. After having continued the evaporation, the liquid, which had become thicker, was dissolved in ether, when the cinchonine remained behind almost pure.

The ether was removed by careful distillation, and the residue in the retort saturated cautiously with sulphuric acid. On evaporation, the solution yielded a large quantity of β-quinine. The mother liquor was evaporated until it yielded, when cold, no more crystals ; it was now dark brown, and water threw down from it a blackish-brown resinous substance. This was removed, the liquid again precipitated by ammonia, and the precipitate dissolved in sulphuric acid. By this last operation, the evapora-

tion of so large a quantity of liquid was avoided, by which the latter would again become brown. The sulphuric solution was now further evaporated, and yielded crystals consisting of α-quinine and β-quinine intermixed, which, as stated above, could be separated.

The liquid poured off from these crystals was now decolourized, precipitated with ammonia, the precipitate dissolved in ether, and treated as before.

Of these three methods, the first is decidedly the best, as by it a greater proportion of β-quinine is obtained before the application of acids and heat. The pure β-quinine is as little subject to be changed as the α-chinin or cinchonine, and it is only when mixed with other substances that it changes as easily. If the pure quinoidin of Winckler be left standing for some time even in stoppered bottles, it becomes darker on the surface. This deep colouration appears very quickly, if the light-yellow coloured quinoidin be kept for several hours fused in a water-bath, or, if dissolved in alcohol or diluted acids and heated, the colour changes them very soon from light yellow to dark brown.

If the colourless quinoidin of Winckler be dissolved in diluted sulphuric acid, and then heated for several hours, till the colour has become dark brown, few or no crystals at all of β-quinine will be formed when it becomes cold. From such a solution water throws down a black precipitate, whilst the liquid becomes lighter coloured. If the solution be now precipitated with ammonia, and the precipitate dissolved in hot diluted sulphuric acid into a perfectly neutral liquid, a large quantity of crystals of β-quinine separate ; there exists, therefore, no doubt, but that the non-formation of crystals is only caused by the presence of the black substance.

The fourth substance which is here spoken of, can be obtained in the decolourized state ; it is thus found in the mixture with β-quinine, called by Winckler pure quinoidin, and in the commercial quinoidin it is met with partly colourless, and partly oxidized by the oxygen of the atmosphere, and coloured brown. This product of oxidation would now form a fifth constituent part of the quinoidin. Nothing certain about this substance can be elucidated from the experiments, only that it is not an alkaloid, and that it is devoid of nitrogen.

β-quinine, when free from water, has the same composition as α-quinine. It appears, also, that besides α and β-quinine and cinchonine, a fourth substance is also contained in commercial quinoidin, and which possesses a less proportion of hydrogen and carbon than quinine. In order, therefore, to elucidate this point, the mixture, consisting of β-quinine, and the substance which turns brown in the atmosphere, which by Winckler is called *quinoidin*, was subjected to analysis. On being dried, the colourless substance became brown, and consequently the analysis went for nothing, as far as regards the composition of this substance ; but the supposed amorphous quinine cannot be of the same composition as quinine. This substance, dried at 130° and turned brown, yielded 74.441 per cent. carbon, 7.491 per cent. hydrogen, 7.466 per cent. nitrogen, and 10.602 per cent. oxygen. The quantities of hydrogen and carbon are the same, that of nitrogen is lower by one per cent. than in quinine.

This shows that the so-called amorphous quinine, even if prepared after Winckler's method, is still a mixture.

β-quinine, $C_{20}\ H_{12}\ N\ O_2 + 2\ H\ O$. From the following, and particularly from the character of the salts, it will be seen that this substance is a peculiar alkaloid, which, in an anhydrous state, has the same composition as anhydrous α-quinine. It differs from the latter as a hydrous base, the base α admitting three equivalents of water, the basis β two equivalents. The latter also contains in some salts less crystalline water than α-quinine. If prepared by the before-mentioned method, it possesses the following properties : it crystallizes from ethereal and alcoholic solutions, in large

klino-rhombic pyramids, which are as clear as water, and become in the atmosphere white and opake, without, however, falling to pieces. At 160° cent., it melts into a colourless fluid, which, when cold, forms a transparent resinous mass. If heated on a sheet of platina, it is dissipated, emitting at the same time an agreeable odour, like that of melilot. At 8° C., it dissolves in 1500 parts of water in forty-five parts of absolute alcohol, and in ninety parts of ether. Of boiling alcohol 3.7 parts, and of boiling water 750 parts, are sufficient from all these solutions ; it for the greatest part falls down again when cold. In this respect it differs chiefly from α-quinine and cinchonine.

The cold aqueous solution reacts slightly alkaline, by alkalies it is rendered milky. Tannic acid causes a white precipitate, whilst nitrate of silver and protonitrate of mercury have no effect on it. Dried at 130° C. this substance gave :

Carbon	74.08	20 =	1500	74.076
Hydrogen ...	7.44	12 =	150	7.405
Nitrogen	8.55	1 =	175	8.642
Oxygen	9.93	2 =	200	9.877
			2025.	

Whilst being dried at 130° C., it loses 10.8 per cent. of water. This quantity corresponds with two equivalents of water, so that the formula of the hydrous salt is that given above ; but that of the anhydrous salt, $C_{20}\ H_{12}\ N\ O_2$, *i. e.* it has in the anhydrous state the same composition as α-quinine.

The salts of β-quinine.—The α-quinine forms, like β-quinine, basic and neutral salts, which possess a very bitter taste. Some dissolve more readily than the corresponding β-quinine salts ; *e.g.* the oxalate, tartrate, and acetate of α-quinine. Hence, neutral oxalates, tartrates, and acetates produce no precipitate in the solutions of a β-quinine salt, whilst in those of the corresponding quinine salts, a precipitate is effected. Some, however, are not so easily dissolved as the first, namely, the muriate and nitrate of β-quinine.

Basic muriate of β-quinine, 2 β-Q + Cl H + 2 H O.—It is easily obtained by saturating the basis with diluted muriatic acid. It forms very transparent white crystals, dissolves in alcohol and water, and differs from the corresponding muriate of quinine only by one equivalent of water, which it possesses less. The air-dried salt lost at 120° C., 4.79 of water. The analysis of the air-dried salt was

$C_{20}\ H_{12}\ N\ O_2$...	—	2 =	4050.0	85.2
H Cl	9.48	1 =	455.5	9.9
H O	4.79	2 =	225.0	4.9
			4730.5	

The salt of the α-quinine corresponding with this, contains three equivalents of water, or one equivalent more than the muriate of β-quinine.

Muriate of β-quinine and chloride of platinum, β 1 Q. H Cl + Pt Cl_2 + 2 H O.—The last salt, dissolved in water, with the assistance of a few drops of muriatic acid, yields, with an excess of neutral chloride of platinum, an orange-coloured precipitate, which, when washed and dried, appears to consist of one equivalent of chloride of platinum, one equivalent of muriate of β-quinine, and two equivalents of water. The air-dried salt lost at 100° C., 4.86 per cent. water. Its composition, is, therefore, the same as that of the corresponding α-quinine double salt. The analysis of the air-dried salt was

Pt	25.65	1 =	1232		25.6
Cl	27.85	3 =	1333		27.6
H O	4.86	2 =	225		4.8
B Ch + H	42.55	1 =	2026		47.0
			4816		100.0

Neutral muriate of β-quinine is obtained when dry muriatic acid gas is conducted over β-quinine dried at 130°. It crystallizes from the solution in water, which is not the case with the equally treated *a*-quinine, which latter, after evaporation, formed a gelatinous mass. 100 parts of β-quinine, dried at 130° C., absorbed 22.518 per cent. muriatic acid gas. 100 parts of *a*-quinine dried at 100°, absorbed 22.864 per cent., consequently the same quantity. The quantity calculated for these neutral salts, amounts to 22.4 per cent.

Basic sulphate of β-quinine, 2 β-Q + S O_3 + 6 H O.—The preparation of this salt has already been given. It looks very much like the corresponding *a*-quinine salt, but is more woolly and softer to the touch. At 10° C. it dissolves in thirty-two parts of absolute alcohol, and 350 of water, the *a*-quinine salt requiring at the same temperature 740 parts of water. The *a*-salt contains moreover seven equivalents of water. Air-dried and heated to 130°, it lost 12.838 per cent. water. The air-dried salt yielded

β-Q	—	2 =	4050		77.5
S O_3	9.58	1 =	500		9.6
H O	12.84	6 =	675		12.9
			5225		100.0

Neutral sulphate of β-quinine is easily obtained by adding to the solution of the last described salt, a few drops of sulphuric acid, and evaporating it. It crystallizes, but is easily dissolved in cold water.

Nitrate of β-quinine.—An excess of β-quinine is mixed with diluted nitric acid, filtered and evaporated, when large crystals are formed, which shine like glass. It differs in so far from the corresponding quinine salts, that the latter does not crystallize under similar circumstances, but requires being first evaporated, in order to remove more acid, then it must be dissolved in water, after which it also crystallizes.

Oxalate of β-quinine, β-Q, $C_2 O_3$ + H O. It cannot be obtained by precipitating a β-quinine salt with an oxalate, as is the case with *a*-quinine, for it rather readily becomes dissolved. The base, therefore, is to be directly saturated with the acid. When the hot saturated solutions become cold, it forms crystals which glitter like mother o'pearl. Heated from the air-dried state to 120° C., it lost 4.32 per cent., equal to one equivalent of water, and is, therefore, composed like the corresponding *a*-quinine salt. Analysis of the air-dried salt :

β-Q	—	1 =	2025.0		78.3
$C_2 O_3$	16.58	1 =	450.0		17.4
H O	4.32	1 =	112.5		4.3
			2587.5		100.0

Tartrate of β-quinine is obtained by the application of tartaric acid the same as the last ; it forms also similar crystals.

Acetate of β-quinine can very easily be dissolved, and crystallizes, therefore, with difficulty. If however, the solution be evaporated till it assumes the consistence of treacle, beautiful transparent crystals are formed in it after a few days, which can already by the mere look be distinguished from the crystals of the acetate of *a*-quinine, which glitter like mother o'pearl.

From this similarity it may already be concluded that the β-quinine is also a remedy against fever. Bauduin has found it in intermittent fevers as effective as α-quinine. Should this fact be substantiated, the preparations of quinine may be obtained at a considerably lower price, for 100 parts of unadulterated quinoidin yielded about

3 per cent. α-quinine,
6—8 per cent. cinchonine,
50—60 per cent. β-quinine,

by a method, which, if carried out on a large scale, must prove even more advantageous than this trial. The preparation of the β-quinine is also very cheap.

ON TARTARUS BORAXATUS.

BY WACKENRODER.

According to the experiments made in *Wackenroder's* laboratory, it appears that the proportions for preparing boracic tartar ought to be one part of borax, and two and a half parts of cream of tartar. The boracic tartar, as prepared according to the Prussian Pharmacopœia, with one part of borax and three parts of cream of tartar (which latter always contains lime) has one-fifth of cream of tartar too much. This is dissolved in the hot solution of the double salt, and afterwards precipitates from the concentrated solution.

The insoluble part of boracic tartar, *i.e.*, the mixed salt which separates from the concentrated solutions of boracic tartar, prepared according to the Pharmacopœia in the form of powder, is neither mere tartrate of lime, nor is the presence of lime the real cause of the precipitation. It varies in its composition according to circumstances, so that the data given in the subsequent analysis are only applicable to the present case. The powder was obtained by adding to glassy *tartarus boraxatus*, prepared according to the Prussian Pharmacopœia, a small quantity of water, and letting the mixture stand for several days. The solution, which was not further analysed, was then removed from the white, very slightly crystalline pulverulent sediment, and the latter was repeatedly washed with cold water on a filter.

The thus obtained powder had an acid taste, did not undergo any change in the atmosphere, and was but very slightly soluble in cold water ; but in boiling water it dissolved, leaving only a trace of tartrate of lime. The analysis of the powder showed the following results, from which for the present case may be deduced the formula $10\,(KO, HO + \bar{T}) + 2\,(2\,CaO + \bar{T} + 8\,HO) + (KO, NaO + 2\,BO_3 + 10\,HO)$.

KO	19.164	..... 11 =	648.9076	.....	19.600
Ca O ...	4.249	..... 4 =	142.4076	.....	4.301
Na O ...	1.046	..... 1 =	39.0897	.....	1.181
$\bar{T}$	61.274	..... 12 =	1988.1000	.....	60.052
BO_3 ...	2.020	..... 2 =	87.2410	.....	2.635
HO.....	12.247	..... 36 =	404.9280	.....	12.231
	100.000		3310.6739		100.000

The precipitation of the powder, cannot, therefore, be caused by the lime in the boracic tartar, since cream of tartar containing lime, retains lime, so that on the addition of water some lime always remains behind. In one experiment, where the boracic tartar had been prepared with pure borax, pure carbonate of potash and tartaric acid, the powder precipitated from the concentrated solution consisted of pure cream of tartar, to the extent of one-fifth of that employed. This proves the truth of the rule laid down in the beginning, with regard to the preparation of boracic tartar,

and which is still further maintained by the following experiments: 2 At (Na O + 2 BO_3 + 10 HO) or 15.0 grammes, and 5 At. (KO, HO + $\overline{T}$) or 37.05 grammes (composed of 13.60 grammes KO + CO_2 and 29.55 grammes 2 HO + $\overline{T}$) having been dissolved in boiling water, both the concentrated solution and the diluted one remained for nine days perfectly clear and without sediment, whilst, on the other hand, 15.0 grammes borax, and 37.05 grammes of common cream of tartar containing lime being employed for a similar experiment, a white powder of 1.11 grammes weight, consisting of 2 Ca O + $\overline{T}$ + 8 HO, and a small quantity, one-tenth of cream of tartar fell down within six days from the solution, amounting to 190 grammes. The elear solution removed from it, still contained lime.

Soluble boracic tartar.—Wackenroder gives the following formula for the preparation of boracic tartar, which may also be denominated *two-fifth boracic tartar.* Twenty-four parts by weight, or two atoms of crystallized borax and fifty-nine parts by weight, or five atoms of perfeetly dry powdered cream of tartar, previously purified as much as possible by muriatic acid, are dissolved in 180 parts by weight of water, by a gentle heat. A small proportion of cream of tartar, perhaps one per cent., usually remains undissolved. The solution is then to be filtered, and immediately evaporated, either to a perfectly dry saline mass, or to a vitreous mass, which is to be finally dried in a warm, perfectly dried air, and thus transformed into a *completely permanent salt.* As a small quantity of water only is to be evaporated, both large and small quantities of boracic tartar ean be easily and in a short time prepared by this method. The salt contains only a very slight trace of lime and iron. This dried boracic tartar dissolves slowly in one-half part of water of + 24° C., and forms a clear syrupy liquid. If this be mixed with about twice its volume of alcohol, a viseid coagulum is formed, and the liquid, when evaporated, leaves only a small quantity of an acid residue, whilst the officinal two-sixth boracic tartar does not yield a clear solution with one-half part of water, and not even with more water; but leaves a eonsiderable sediment, which disappears by heat, but gradually reappears when the solution, after having beeome cold, is left quiet.

The proportion of water in the boracie tartar, when eomposed exaetly of 2 (Na O + 2 BO_3 + 10 HO) and 5 (KO, HO + $\overline{T}$) appears to explain the character of this combination, and particularly that of the dried compound. It is very likely that the tartaric acid contained in it has undergone some change. If the solution of the salt be so far evaporated that the syrupy residue is covered with a thick film and begins to swell, then the mass solidifies when cold into a soft vitreous substanee. Its weight is then approximately the sum of all the salts employed. Its composition may be expressed by 2 (Na O + 2 BO_3 + HO) + 5 (KO, HO + $\overline{T}$) or by 2 Na O + 5 KO + 4 BO_3 + 5 $\overline{T}$ + 25 HO. If the soft mass be allowed to become drier at about 65° C., till it becomes tough, but not yet perfectly hard, then it has lost about one-third of its 25 HO. In one experiment, the loss of water was found to have been equal to seven atoms, in another somewhat more. If the transparent salt be exposed for some time longer to the same temperature, it becomes opake, cracked, and hard; and it had then lost not only twenty-five atoms HO, but even two or three atoms more than are eontained in the salt aecording to the formula. If the vitreous boracic tartar be heated for from eight to fourteen days in a drying-stove to a heat of 50°–70° C., its weight continues to decrease, till the residue amounts to only 77.6 per eent. of the salts employed. This weight it preserves, even if the heat be inereased to 100° C. or more. The entire loss of weight eorresponds then with thirty-three atoms of water. Boraeic tartar dried in this way is not deliqueseent. In

a damp cellar it becomes soft, but soon again becomes hard in a dry atmosphere. It forms a yellowish-white opake mass. If, however, it be not dry enough to be perfectly brittle, but only so that it may be reduced to powder according to the directions of the Pharmacopœia, it possesses the bad quality of conglomerating in well-closed vessels, or melting into a transparent viscid mass. The imperfectly dried salt readily becomes in a damp atmosphere soft and tough, and retains this consistence even when again placed in dry air of a higher temperature. The process of perfectly drying the boracic tartar succeeds very well in the sun during the summer, but it goes on much quicker if it is rubbed, whilst in the hard vitreous condition, in a porcelain cup, into a fine powder. The conglomerating or balling of the boracic tartar takes place only with such preparations as have been imperfectly dried.

It may be assumed, that at 130° C. to about 150° C., eight atoms of water are generated from the tartaric acid by its conversion into the anomalous tartaric acid $\overline{T}_a$. The compositions of the boracic tartar in the two conditions are accordingly

Soft, vitreous.		*Dried at 50°—130° C.*	
5 KO	294.9580	5 KO	294.9580
2 Na O	78.1794	2 Na O	78.1794
4 BO_3	174.4820	4 BO_3	174.4820
5 $\overline{T}$	828.3760	4 $\overline{T}_a$	572.7168
25 HO	281.2000	1 $\overline{T}$	165.6752
	1657.1954		1286.0114

With regard to the formula of the hydrous boracic tartar, it may with the greatest correctness be deduced from that which expresses the composition of the dry salt, namely : 4 (KO, $\overline{T}_a$) + (2 Na O, KO + 3 BO_3) + (BO_3 $\overline{T}$), but it is presumed that $\overline{T}_a$ is monobasic, and that there exists an anhydrous boracic tartaric acid, which the author will notice hereafter.

The remarkable circumstance that tartaric acid, $\overline{T} = C_8 H_4 O_{10}$ contained in boracic tartar becomes transformed at a low temperature into the anomalous acid, may perhaps justify us in considering the latter acid as the original one, so that the formula of the common crystallized tartaric acid would be not $\overline{T}$ + 2 HO, but $\overline{T}_a$ + 4 HO, or still better, $\overline{T}_a$, 2 HO + 2 HO, in which $\overline{T}_a = C_8 H_2 O_8$.

ON THE LARGER CELLS OBSERVED IN CHOLERA EVACUATIONS BY J. G. SWAYNE, ESQ., M.D., DR. BUDD, AND OTHERS.

BY THE REV. M. J. BERKELEY, M.A., F.L.S.

It is not my intention to enter at all into the controversy which has lately arisen respecting the origin of cholera; but as specimens of the different bodies detected in cholera evacuations have been submitted to me by persons entertaining very different views on the matter, I conceive that it may not be considered intrusive if I offer a very few words on the subject. I assume that all parties are now pretty well agreed that the identity of the cells, or cell-like bodies, discovered under various circumstances, and in various media, must be given up. There can be no doubt that bodies of very different characters occur, resembling each other more or less externally, but very distinct in origin and in chemical composition. Some of these are mineral, some either parts of vegetables, or really spores of fungi, and some again portions of animal tissues more or less perfect or decomposed. Portions of spiral vessels may be detected in any sample

of the aromatic confection exhibiting entire or broken rings and spirals mixed up with the bodies peculiar to chalk and vegetable cells ; and that many of these bodies would remain uninjured, in the evacuations of persons affected with cholera, cannot be doubted. I have reason, however, to believe, that by the word annular bodies, real rings or parts of rings were not so much intended as cells presenting a ring-like outline. The rings may in some cases have been confounded with the cells, but it is the latter that were recorded as the early stage of growth of the larger bodies to be noticed presently. No evidence was, however, given of the identity of such cells by accurate measurement, or by germination, or, indeed, in the first instance, by any nicely conducted chemical tests ; and it is now not only very clear that the cells are not identical, but there is little or no reason, especially when the matter is considered with reference to what is known of the growth of fungi, to believe, if they be considered of fungal origin, that the smaller bodies have in any instance a positive connexion with the larger ones, though it will be admitted that bodies do occur, and sometimes in great abundance, which have at least a very close resemblance to the reproductive organs of fungi, whatever their real nature may be. A specimen of cholera evacuation, transmitted to me several weeks since, by Mr. H. O. Stephens, of Bristol, abounded in such cells, which were most clearly organic, though I could not satisfy myself as to their exact nature. In this specimen I could detect none of the larger bodies, though I have seen them since accompanied by the smaller cells, and very recently in a specimen from Bridgewater, kindly communicated by Dr. Swayne. I have had a fluid under examination abounding with the larger bodies, but quite destitute of the smaller, and teeming with twin obversely conical bodies, which are said to be oxalate of lime.

The nature of these larger bodies is very doubtful. The conclusion that they are identical with the spores of *Uredo segetum* (or rather of *Uredo caries*, which is the species really meant) is incorrect. The mean size of the spores of *Uredo caries*, as ascertained by Messrs. Tulasne, is 0.0176 of a millimeter, which gives 0.00068 of an English inch. The larger bodies of cholera evacuations vary much in size. My own measurements give 0.0035 of an inch as the mean of the axis major of their elliptic outline ; so that they are 5.14 times longer.* Besides which, the cholera bodies are constantly elliptic, and only globose when seen in the direction of their apices ; whereas the spores of bunt, except in infancy, are always globose, and very uniform in size. Indeed, I am not acquainted with any *uredo*, taking the term in its most general sense, where spores resemble the bodies in question, nor do I know anything amongst fungi of precisely the same character, though there is a certain resemblance in them to the spores of some truffles. The bodies, then, are elliptic, of a brownish hue, presenting sometimes a uniform slightly tuberculatedness, without any distinct nucleus ; but more frequently there is a distinct coat to the cells, consisting of several layers, the cavity being either entirely filled with a grumous mass, or more frequently occupied by one or two distinct more or less globose nuclei, which are in their turn occasionally invested with a distinct transparent smooth coat. In some individuals the tubercles are connected by raised ribs, so as to present a reticulated appearance ; and I have one mounted specimen in which the ribs are very strongly developed, and project very much from the surface, though in general the reticulation is faint, and requires a nice adjustment of light to be seen satisfactorily. These different states resemble strongly the sporidia of the genera Genea and Tuber, though, besides size, there are certain evident differences, especially the stratose epispore. It would be saying too much

* Dr. Swayne's figures in the *Lancet*, 1849, p. 532, make the proportion rather less.

to assert that an epispore consisting of several distinct layers is never found in fungi, but it is at least very rare, and even in the very few supposed exceptions, requiring confirmation. In general there is merely the outer cell, and the inner membrane which encloses the endochrome. It would appear that this inner membrane has very rarely a thin lining, which, when the endochrome contracts, contracts with it. The most marked instance of a stratose epispore is in Myxosporium puniceum, Corda; but I believe this to be of animal origin, and perhaps is nothing more than the eggs of some Clausilia. The specimen I have examined does not appear to me to belong to fungi, nor do I think that it is an Alga.† There is another very rare circumstance about the cholera bodies; namely, that the nucleus itself acquires a coat. This, again, may not be absolutely without example, but it is of very rare occurrence; and the two circumstances concurring in the same individual are very strongly against the fungous origin of these bodies. There is another genus whose spores bear a certain resemblance to these,—Artotrogus, Montagne, of which a figure will be found in my Memoir on the Potato Disease, in the first volume of the *Journal of the Horticultural Society of London;* but the resemblance is far from perfect, speaking even generically, and no species of the genus is known with spores exactly resembling the cholera bodies. My own impression is, that they do not belong to any fungus, and though something might be said as to their resemblance to the spores of some *algæ*, I do not know any to which they could with the slightest probability be referred.

It should be observed, too, that the mode of reproduction supposed by the original observers of these bodies is quite at variance with anything recorded in fungi. If the bodies were sporangia they might then contain reproductive cells, though I have observed nothing of the kind. But supposing this to be the case, they must produce some mycelium previous to the reproduction of sporangia. The notion that the lesser bodies are gradually developed into the larger without any intermediate stage, is quite contrary to every notion of fungi, though it might be consistent enough with what is observed in algæ. Spores, indeed, after their detachment from their sporophores, frequently grow and acquire a more complicated epispore, as in the case of Scleroderma and other genera, but a spore never produces a new mother cell in fungi without germination; and, possibly, when the intimate structure of the lower algæ is completely ascertained, many apparent exceptions will disappear.

The best test of the real nature of the cholera bodies would be their germination; but unfortunately circumstances prevented my making any experiment, and the season is not very favourable for such researches. The simplest way is to place a small drop of the fluid, containing one or more of the bodies, diluted with a little water, upon a slip of glass. This is to be covered with a plate of thin glass, taking care that when the upper plate is luted with wax to the larger and lower slip, there shall be a little air between the drop of fluid and the margin into which the bodies may germinate. Especial care must be taken that the positive connexion of any mucedinous threads, which may be given off by the fluid with the bodies, is accurately ascertained, and the growth observed till the threads bear fruit. A negative result would leave the matter where it is, as even under circumstances apparently the most favourable, the spores of fungi will not always germinate. Care, meanwhile, should be taken to ascertain, by means of sure chemical tests, whether the bodies are of an animal or vegetable nature. But even should it be decided in favour of the former view, it will still remain to discover what they are, as it should seem that no ova of entozoa are known which can be reconciled with them, and there is no reason to believe that they are an altered form of any tissue of

† The second supposed species is merely an imperfect Trichia.

the human frame. The bodies certainly do not exist in all cholera evacuations, and M. Follin, who has examined with great diligence the matters vomited or evacuated by cholera patients, has discovered nothing at all resembling them, *as was the case with Messrs. Andral and Gluge in 1832. —*Medical Gazette.*

ON THE CEPHAELIS IPECACUANHA.

BY M. WEDDELL.

The introduction of ipecacuanha as a European remedy does not date anterior to the end of the seventeenth century. The first discovery of it, no doubt, is due to the Indians who preceded the Portuguese in the Brazilian territories, or, if we are to believe tradition, we may consider man, as in the case of the cinchona bark, to have been preceded by the animals.

The origin of the word *ipecacuanha* is very obscure, and in no part of Brazil is it employed to designate the *Cephaelis*, while, on the contrary, that of *Poaya* is most generally used.

Modern authors who have written on the *Cephaelis ipecacuanha* state it to exist in a vast zone, comprising all the provinces of Brazil, from the equator to the tropic of Capricorn, and between the Atlantic and the mountainous country of the interior. During late years, however, this region has become much extended ; and at the present time its longitude is equal to its latitude. In the year 1824 the *Cephaelis* was discovered in the province of Matto-Grosso ; but no exportation of it took place until about the year 1832. It is this part of the Brazils which now wholly maintains the European commerce of it.

The appearance presented by the forests in which the Cephaelis grows is not easily forgotten. Nearly all those of Matto-Grosso are situated in the basin of Rio-Paraguay, or its tributaries, above the small village of Villa-Maria. Generally, however, the plant does not grow in the immediate vicinity of rivers, as the periodical inundations to which these are subjected, are unfavorable to its free vegetation.

It is in situations where a slight elevation of land preserves it from these submersions, that the *Cephaelis* is mostly met with. It grows in the shade of those majestic trees which constitute the intertropical forests, and more particularly in the moist sand, impregnated with vegetable remains, which borders on the marshes planted with *Mauritia*, *Iriartea*, and tree ferns.

In size the *Cephaelis* is scarcely equal to the small daphne of our woods, which it slightly resembles ; it rarely grows alone, but almost always in small clumps, which the collectors of *Poaya*, or as they are called *Poayeros*, know by the name of *Redoleros*.

The method adopted in collecting the root of the *Cephaelis* is as follows: The *Poayero* grasps in one hand, if possible, all the stems forming one of these clumps, whilst with the other he pushes under the roots a pointed stick giving it a swinging motion. By this means the earth surrounding the roots gives way, and when the operation is performed with dexterity, they are all withdrawn at the same time, and almost always without fracture. The *Poayero* then separates the portion required, and places it in a bag carried for the purpose ; he then proceeds to the next clump, and so on. An ordinary workman may collect in a day about from three to six kilogrammes of ipecacuanha, which in desiccation loses about half its weight. This latter operation takes place in powerful sunshine.

The propagation of the *Cephaelis* is by seed ; but in localities where it is constantly exported it is effected by means of portions of the roots accidentally left in the ground by the *Poayeros*. Each of these fragments

* *Comptes Rendus des Séances, et Mémoires de la Societé de Biologie, pendant l'Anneé* 1849. No. iii., Mars, p. 48.

after a certain time produces a bud, which forms a fresh plant. The vegetation of the *Cephaelis* in round clumps is also probably consequent on this particular manner of propagation. It, therefore, appears from this fact that the exportation of ipecacuanha will have an effect contrary to many analogous cases, that of subjecting the *Cephaelis* to a mode of cultivation particularly suited to it, and the fires which occur so frequently in the forests, will tend to this favourable result, by clearing the surface of the earth of those accumulations of vegetable matter, which at last frequently choke up and kill even the adult plants themselves.—*Répertoire de Pharmacie.*

ON THE MANUFACTURE OF VARNISHED LEATHER IN FRANCE,

This process consists of two operations ; first, the preparation of the skin ; and second, the varnishing of the leather thus dressed.

In the preparation of the leather, linseed oil, made readily drying, by means of metallic oxides and salts, is employed as the basis ; for each twenty-two gallons of linseed oil, twenty-two pounds of white lead, and twenty-two pounds of litharge are employed, and the oil is boiled with these ingredients until it has attained the consistence of a syrup. This preparation, mixed either with chalk or ochres, is applied to the leather, by means of appropriate tools, and well worked into the pores ; three or four layers is applied in succession, taking care to dry each layer thoroughly before the application of the next coating. Four or five coatings of the dried linseed oil, without the admixture of the earthy substances, are then given ; the addition of very fine ivory black, and some oil of turpentine, is usually made to the oil. These coatings are put on very thin, and when carefully dried, the leather is rubbed over with fine pumice-stone powder, to render the surface perfectly smooth and even, for the reception of the varnish. The varnish is composed as follows :—ten pounds of the oil prepared as above, half a pound of asphalt or Jewish bitumen, five pounds of copal varnish, and ten pounds of turpentine. The oil and asphalt are first boiled together, and the copal varnish and the turpentine added afterwards, and the mixture well stirred. Instead of asphalt, Prussian blue or ivory black may be employed. This varnish must be kept in a warm place for two or three weeks before it is fit for use.

The greatest possible care must be taken both before and during the application of the varnish, to prevent the adherence of any dust to the leather. The leather, when varnished, must be put into drying stoves, heated to about 90° or more, according to the nature of the leather, and the varnish employed.

Some very fine specimens of leather prepared in this manner were exhibited at the recent exhibition of the products of French industry, at Paris.—*Patent Journal.*

COMPOSITION FOR LUBRICATING MACHINERY, &c.

A patent has recently been enrolled by Mr. Alexander Mankittrick, of Manchester, for an "improved" composition for the above purpose, for the preparation of which the following is the process given :—

Take of	Caoutchouc dissolved on spirit of turpentine ...	4 pounds
	Carbonate of soda	10 "
	Glue	1 "
	Oil	10 gallons
	Water	10 "

Dissolve the carbonate of soda and glue in the water by the aid of heat, then add the oil, and, lastly, the caoutchouc, mixing the whole together until perfectly incorporated.

CHLORIDE OF CARBON A SOLVENT FOR CAOUTCHOUC, GUTTA PERCHA, &c.

Mr. George Simpson, of Newington Butts, and Mr. T. Forster, of Streatham, have taken out a patent for this new solvent for India-rubber, &c., which is directed to be made in the following manner :—

A stone-ware vessel is placed within another and larger vessel of iron, or other material. Close alongside the first vessel is placed another and similar stone-ware vessel, and this is also placed in an outer vessel. The spaces between the inner and the outer vessels communicate by pipes with a boiler, by which means steam can be admitted into that space. The two stone vessels communicate together by a pipe, which proceeds from the top of the first of them to near the bottom of the second, while another pipe communicates from the top of the second vessel to a condenser worm, placed in a vessel or tub of cold water, the lower part of the worm communicating with a receiver. A quantity of bisulphuret of carbon is placed in the first stone-ware vessel through an aperture in its top, and a quantity of the pentachloride of antimony is placed in the second stone-ware vessel. The two apertures in the vessels are then closed air-tight, and steam from the boiler is admitted to the spaces between the two stone-ware vessels and their cases ; by this means the bisulphuret of carbon is vaporized, and made to pass through the pipe of communication into the second vessel, and here through the pentachloride of antimony ; the resulting vapour passes then into the condensing worm, where it is condensed, and flows into the receiver ; the result being chloride of carbon, which is afterwards to be employed as a solvent for India rubber, gutta percha, and other gum resins. The proportions of the materials which the patentee recommends are, one part (by weight) of the bisulphuret of carbon to eight parts of the pentachloride of antimony, and after the pentachloride of antimony in the second stone-ware vessel shall be exhausted of the chlorine, it may be reimpregnated in the usual manner.

USE OF ACETATE OF ALUMINA IN THE MANUFACTURE AND REFINING OF SUGAR.

Messrs. R. and J. Oxland, of Plymouth, have recently patented a process for the defecation of saccharine solutions by means of acetate of alumina. In applying the process to cane or beet-root juice, the solution is first boiled with carbonate of lime to neutralize any acid; it is then strained, and acetate of alumina being added, it is again boiled. After the defecation has been effected, a little solution of tannin is added to precipitate any remaining alumina, and carbonate of lime to neutralize free acid. About four pounds of alumina dissolved in acetic acid, is said to be sufficient for one ton of sugar.

BOTANICAL AND PHARMACEUTICAL DESIDERATA.

(*From the Manual of Scientific Enquiry, edited by Sir F. W. Herschel, Bart.*)

(*Continued from page* 286),

ASIA (INCLUDING AUSTRALIA.)

[*N.B.* Being sent by way of the Red Sea, it may be remarked that some of the products, enumerated under this head, are derived from Abyssinia, Arabia, or the east coast of Africa.)

Ammoniacum.—Determine the true origin of this gum-resin by specimens of the plant yielding it in Persia, forty-two miles south of Ispahan. Another kind is equally worthy of inquiry from Morocco in Africa, with the gum-resin and exact locality.

Sagapenum.—A gum-resin : its source ? It is said to come from

Persia, and to be derived from a *Ferula*. Specimens of the plant with the gum-resin which it affords are desirable.

Galbanum.—Whence obtained? It is brought to us from Singapore and Persia.

Gamboge.—Specimens in flower, and fruit of the plant affording the gamboge of Siam, and the mode of extracting this and other kinds of gamboge, such as that of Ceylon, &c.

Animi Gum, or *Piney Varnish*, said to be produced by *Vateria Indica*.

Copal.—The origin of this gum-resin in India?

Bdellium.—The source of the Persian and African *false myrrhs* of this name, the localities producing them, the native names, and specimens both of the products and the plants.

Olibanum.—The above remarks apply to olibanum.

Elemi.—The source of the five varieties of Elemi, *viz.*: 1. Holland Elemi. 2. Brazilian Elemi. 3. East Indian Elemi, in bamboos. 4. Manilla Elemi; and 5. Mexican Elemi. Samples from the various countries, with the plants and native appellations, should be transmitted for verification. Is any *Elemi* procured from Ceylon?

Tragacanth.—The tragacanths of Mount Ida and Mount Libanus have never been correctly traced to the plants which yield them, nor has Tournefort's relation of the formation of this substance in the bark been confirmed. It is still more important to ascertain if the tragacanth of Erzeroom is brought into British commerce, and whether it is yielded by the *Astragalus strobiliferus*.

Senna.—The source of the East Indian or Mocha senna. Is it really the foliage of *Cassia lanceolata?*

Catechu.—To observe the processes by which the various kinds of *Catechu*, *Cutch*, *Terra Japonica*, and *Gambir* are obtained; and if from trees, whether from others besides *Acacia Catechu*, *Areca Catechu*, and *Uncaria Gambir*. We want to identify the trees with the respective extracts.

Cubebs.—Does *Piper Cubeba* or *Piper Caninum* in Java yield cubebs? If both, which gives the best?

Cassia.—Botanical specimens of the plants *seen* to yield *Cassia bark* in Kwagse, China, Malabar, Egypt (and Brazil).

Cassia-buds of the grocers'-shops.—To procure specimens of the bark in Cochin-China and Japan, and flowering specimens for the Herbarium.

Rhubarb.—The true source of the medicinal rhubarb, and especially of the Batavian rhubarb. Strange to say, we are still in the dark respecting the real origin of this most valuable drug! In this and all such cases the drug should be procured by one who is an eye-witness to its being gathered, and specimens of the foliage and fruit should accompany it, and be carefully dried for the Herbarium on the spot.

Arrow-root.—The sources of the East Indian arrow-root. It is made largely at Travancore.

Salep.—The different plants which yield salep in Asia Minor, Persia, and especially the best kinds.

Aloes.—The true sources of the Soccotrine, Clear, Bombay, Hepatic, East Indian, and Mocha aloes.

Minia Batta, or *Stone Oil*, from Borneo.—Whence is this solid oil or fat obtained? Is it abundant or rare?

Gutta Percha.—That of Singapore is ascertained to be the product of a new plant, *Isonandra Gutta* of Hooker, in the *London Journal of Botany*, vol. vi. p. 331, 463, tab. 17. [*Pharmaceutical Journal*, vol. vii, p. 179]. The appearance of the inspissated gum, which is imported from Borneo under that name, indicates a different source. Other Malay islands are said to afford *gutta percha*, but probably from yet other plants. This should be inquired into: the chemical characters of the juice in a fresh state should be ascertained, and compared with those of caoutchouc.

Green Tea.—Is indigo or any other vegetable dye used to colour the green tea in the northern provinces of China? Specimens of the plant and dye so employed are desiderata. Is turmeric or any yellow vegetable dye used in conjunction with it, or with Prussian blue?

Japan Wax.—The true source of this wax.

Assafœtida.—From what species of *Ferula* is this extracted, and how? Does the same species yield the *Tear assafœtida* and the *lump?* Specimens of the one or several assafœtida plants should be procured, with the gum-resin produced by each species.

Patchaouli, or *Puchá Pát.*—A well-known perfume, of comparatively recent introduction to Europe. It is referred to a plant now described by botanists under the name of *Pogostemon Patchaouli;* but we are ignorant of the mode of its preparation and the exact locality where it is produced.

Sago of Japan.—Is it from a *Cycas*, and what species? Also specimens of sago in different stages of manufacture, with the trees yielding them, from the various parts of the Indian Archipelago; so that we may identify the particular kinds of sago yielded by the several sago-palms. Is the Ceylon sago the granulated pith of the *talipot-palm* (*Corypha umbraculifera?*)

Korarima.—A large kind of cardamom, or aromatic fruit (an *Amomum?*), found in the markets of Shoa, but probably the produce of a country farther to the west.

Scammony.—Particulars of the manufacture—or, to speak more correctly—the adulteration of scammony, carried on at Smyrna. What is the purgative resin or gum-resin (if any) which is added, with the view of increasing the bulk and the medicinal activity of the mixture?

Camphor Oils.—There are two sorts: one brought from the East, does not deposit crystals by keeping; the other does. Is the former the produce of *Dryobalanops Camphora?* If so, what is the source of the latter? Is it obtained from the foliage of *Laurus Camphora* (*Camphora Officinarum*, Nees), or is it an artificially manufactured article? The camphor deposited is said to be similar to common camphor.

Kino.—All particulars of details about the manufacture of East Indian kino (*Pterocarpus marsupium*) are desirable.

Turmeric.—The several commercial sorts of turmeric differ so much in external character as to throw doubt on the identity of their origin. Are they not the produce of several species of *Curcuma?* Well-dried specimens, accompanying the root, should be transmitted from different parts of India.

The Grass-Oils.—The grasses used in India for affording the oils imported as grass-oils, lemon-grass oil, and essence of verbena, or verbena-oil, to be ascertained, and samples sent home, with details of the manufacture.

Storax of commerce is supposed to be obtained from the *Liquidambar orientale* of Cyprus, and comes by the Red Sea from the Persian Gulf; but the subject requires investigation, for others believe the plant grows in Cobross, an island of the upper end of the Red Sea. Dr. Pereira has ascertained that the *liquid storax* comes to us by way of Trieste; the storax of the Indian Archipelago is yielded by the *Liquidambar altingia* of Blume.

Adelaide Resin.—What is the source of the red resin from this colony of South Australia?

(*N.B.* The various gums yielded by many trees and barks affording tannin in Australia require careful investigation.)

Is the true *cinnamon* of Ceylon the production of one species, or are other kinds employed? What occasions the red colour of the oil of cinnamon from Ceylon?

Tacamahaca of Ceylon.—Specimens obtained from *Calophyllum inophyllum*

are desirable, in order to aid pharmacologists in accurately determining the Tacamahaca of European commerce.

Ceylon (Long or Wild) Cardamom.—What is the plant so called in Ceylon, and named by Mr. Moon *Alpinia Granum Paradisæ?* Can it be identical with the true *Grains of Paradise* of the western coast of Africa?

Rice-paper of China.—This has been incorrectly referred to the Shola (*Æschynomene asperata*); but we are still quite ignorant of the origin of this familiar and exquisitely delicate substance. It is the pith of some plant, but what?

ON AN ADULTERATED MURIATE OF MORPHIA AT PRESENT IN THE MARKET.

BY MESSRS. JOHN F. MACFARLAN AND CO.

Our attention having recently been called to a muriate of morphia which was not so efficacious in its operation as that which the party had been accustomed to take, we subjected it to a careful examination, and found it to be wanting in the due proportion of morphia.

Muriate of morphia properly prepared, ought to contain about seventy-five per cent. of pure morphia. The mean of three experiments made with this article, obtained from two different quarters, gave only 54.73, with its equivalent of hydrochloric acid, which at once accounted for its inferiority in efficacy, and led to the inquiry as to what was substituted instead of the morphia. The mother-water was then examined, and yielded a crystallizable substance, exhibiting the properties of *salicine.*

The mean of two experiments made with muriate of morphia of our own manufacture, gave 76.15 of pure morphia, with its equivalent of hydrochloric acid, and the comparison may be stated thus :—

100 *grains pure muriate gave*	100 *grains adulterated muriate gave*
76.15 morphia	54.73 morphia
13.65 combined water	11.30 combined water
9.41 hydrochloric acid	7.23 hydrochloric acid
.79 loss	26.74 deficiency
100.	100.

We have abstained from giving the details of our experiment, because, from the importance of the subject, both in a medicinal and commercial point of view, we have been induced to place the matter in the hands of Dr. Douglas Maclagan, so favourably known as a lecturer on Materia Medica, in order that it may undergo a more thorough investigation, and we would have abstained altogether from taking any notice of the adulteration until this investigation had been completed, were it not that we have reason to believe that the article has been extensively sold throughout the country, and may occasion much disappointment to the practitioner, tending at once to bring morphia into discredit, and leave suffering unrelieved.

The adulterated muriate is in external appearance unexceptionable, is entirely soluble, and leaves no residue on incineration, but fortunately the detection of the adulteration is a very easy matter. The application of the test given in the Edin. Pharmacopœia will show a deficiency of morphia, and sulphuric acid the presence of salicine. The simplest mode of testing the presence of the salicine, is to put into a small tube thoroughly dry, a little of the muriate, and pour over

it a few drops of strong sulphuric acid. If the morphia be pure, it dissolves with but little change of colour. If it contain salicine, it becomes of a pink colour, gradually deepening to a dark purple.

In making this experiment, it is essential that the sulphuric acid be entirely free from any admixture of nitric acid, otherwise the action of even a very small portion of the nitric acid on the morphia will so deepen it as to prevent the detection of the salicine; but with this exception, the ordinary sulphuric acid will suffice. If, however, the experiment be made with *pure* sulphuric acid, the result is much more satisfactory—the pure muriate forming a transparent colourless solution—the spurious, a clear, beautiful pink, gradually becoming a very deep purple.

Edinburgh, 22d December, 1849.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

My dear Sir,—Mr. Macfarlan, of Edinburgh, having enclosed to me a letter for insertion in your Journal relating to the adulteration of hydrochlorate of morphia, together with a request that I would ascertain whether the adulterated article alluded to has been introduced into the London market, I have examined several commercial specimens, and find that a large quantity of the salt containing salicine has been sold, and still continues to be offered for sale, in London. This sophisticated preparation is not distinguishable in appearance from the genuine.

As manufacturers, both Mr. Macfarlan and myself have been much astonished at the prices at which morphia salts have been recently offered for sale; but considering the highly respectable sources from which they were represented to come, we had not suspected, what now appears to have been, the means by which fair competition was set at defiance.

Yours truly,

9, *Southampton Row, Russell Square*, *Dec. 24th*, 1849. T. N. R. Morson.

FERRI ET QUINÆ CITRAS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Although the test recommended by Mr. Barnes may show the *presence* of quina in citrate of quinine and iron, yet it is perfectly useless for ascertaining the *quantity*. On the addition of ammonia to a solution of the above article, quina is thrown down, but on adding water to wash the precipitate, the greater portion is redissolved; and if the solution be very dilute, no precipitation will take place, or if formed, will be redissolved.

The best method I know of for calculating the proportion of quina in any given sample is this: Add to a solution of the citrate of quinine and iron some magnesia; allow the mixture to stand in a warm place for an hour or two, occasionally shaking it; pour off the supernatant liquor, and separate the quina by means of rectified spirit. This being evaporated, will give the weight of quina.

I am, Sir, your obedient servant,

Islington, December 20, 1849. Thos A. Barber.

[We do not think this process is any improvement on that previously given by Mr. Barnes. In either case the salt operated upon must be in solution, and the precipitate obtained must be washed, so that a little of the quinine would be thus lost in consequence of its being soluble to a certain extent in water. The operator, bearing in mind that the alkaloid is soluble in 400 parts of cold water, and still more soluble in caustic ammonia, should avoid using more of either than is absolutely necessary.—Ed. Ph. Journal.]

ADULTERATION OF WHITE PRECIPITATE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I can fully corroborate the statement of Mr. J. B. Barnes as to the extent of the adulteration of white precipitate, having received a parcel, which I purchased as "pure" from a highly respectable firm in London, yielding the same result. I kept it till the gentleman (of whom I ordered it) called on his journey, and he unequivocally stated that the manufacturing Chemist sent it to him as genuine.

The "City Drug-house of some fame," cannot boast of a very respectable country connexion if their customers will not pay the price for a genuine article. I am, Sir, your obedient servant,

Warwick, Nov. 21, 1849. H. Baly.

WHALEBONE SPATULA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I have found spatulas made of whalebone of infinite service for the nitrated and other ointments where iron is objectionable. If you think this suggestion worthy a place in the Journal, you will much oblige me by inserting it. I am, Sir, your most obedient servant,

T. H. Tustin.

London Hospital, December 14*th*, 1849.

EXHIBITION OF THE WORKS OF INDUSTRY OF ALL NATIONS IN 1851.

We understand that a Royal Commission for inquiring into the best mode of carrying out the Exhibition of Industry of all Nations, in 1851, will shortly be issued, and is likely to consist of heads of parties and interests, members of the present and late Administration, representatives of agriculture, art, science, mechanics, and manufactures. It is proposed, in addition, to nominate any number of local Commissioners desirable to represent all interests both at home and abroad.

POISONED GAME.

The following extract from a local paper has been forwarded by a correspondent:—

"A few days ago, a Lincoln gentleman who was out shooting, picked up a dead partridge, which, having no mark of injury upon it, excited his attention. On arriving home he opened the bird, and submitted the wheat, &c., in the stomach to analyzation. The quantity of arsenic discovered was pretty nearly sufficient to have poisoned an entire family; and had this bird been found by poachers, or netted by them when unable to fly, it would, in all probability, have been sold to the dealers, and thus a very serious affair might have resulted from the steeping of seed in arsenic."

REVIEWS.

A Manual of Botany; *being an Introduction to the Study of the Structure, Physiology, and Classification of Plants.* By J. H. Balfour, M.D., F.L.S., &c., Professor of Medicine and Botany in the University of Edinburgh. London: J. J. Griffin and Co., 1849; pp. 641, with 831 Woodcuts.

Professor Balfour's work is what it professes to be, a complete Manual of Botany, embracing the entire range of the science.

The work is divided into Four Parts, viz.—1. Vegetable Anatomy, Organography, and Physiology; 2. Systematic Botany, Taxonomy or

the Classification of Plants; 3. Geographical Botany, or the Distribution of Plants over the Globe; 4. Fossil Botany; and an Appendix is added on the Use of the Microscope in Botanical Researches, on collecting and examining Plants, and on the formation of an Herbarium.

The first part is preceded by a few excellent introductory remarks on the object and utility of Botany. This is followed by a description of the Elementary Organs; then the Compound Organs, viz., those connected with the nutritive functions, and those connected with the reproductive functions; at the conclusion of each section a chapter is devoted to a general view of the functions of the nutritive and reproductive systems; and a very interesting chapter is given on the application of Botany to Agriculture, &c. This part of the work concludes with a section on the general phenomena of vegetation, such as the diseases, colours, odours, &c., of plants. The second part, on Systematic Botany, commences with a short account of the nomenclature, abbreviations, and symbols used in Botany, and definitions of the terms:—species, genera, orders, and classes. This is followed by a brief account of the Systems of Classification of Linnæus, Jussieu, De Candolle, Endlicher, and Lindley. In this work the System of De Candolle is followed, with a few modifications, the most important of which consists in dividing the class *Monocotyledones* into two sub-classes, viz., *Dictyogenæ* and *Endogenæ*, as first suggested by Dr. Lindley, in his valuable standard work on the Vegetable Kingdom. We cannot, however, think that the sub-class, *Dictyogenæ*, is by any means supported by observation; and the published papers of Mr. Henfrey on this subject appear to us conclusive against its adoption. After an account of the different systems, a description is given of the Natural Orders, containing the essential characters of each, derived chiefly from the researches of Walker Arnott, and Lindley, and the more important plants which each order furnishes to medicine, the arts, and domestic economy are described.

The third and fourth parts present a faithful, although necessarily brief account of Geographical and Fossil Botany. We know too little at present of the Geographical Distribution of Plants to be able to treat this subject in the comprehensive manner it so eminently deserves, but all that is at present known respecting it, is briefly described by the author, special attention being paid to the recent researches of Watson, and Forbes on the Distribution of Plants in Britain. The work is concluded by a copious index, which, from the manner of its arrangement, also serves as a Glossary of botanical terms.—In the chapter on the Diseases of Plants, the author says:—

"Concerning the influence of atmospheric changes on plants, very little has been determined; many extensive epidemics seem to depend on this cause. Thus, the late potato disease must be traced, apparently, to some unknown miasma conveyed by the air, and operating over large tracts of country; the disease probably affecting some plants more than others, according to their state of predisposition, and in its progress leading to disorganisation of the textures, alteration in the contents of the cells and vessels, and the production of Fungi, &c. In the early stage of the disease, a brown granular matter was deposited in the interior of the cells, beginning with those near the surface. For some time the cell-walls and starch-grains remained uninjured, but were ultimately attacked, the former losing their transparency, and the latter becoming agglomerated in masses. Subsequently to this, parasitic organisms of various kinds made their appearance, cavities were formed, and rapid decay took place. Among the vegetable parasites, were detected species of *Fusisporium*, *Oidium*, *Botrytis Capillaria*, *Polyactis*, &c. The prevalence of hot or cold weather, the amount of light and moisture, changes in the atmosphere, and electrical conditions of the air and earth, are, in all probability, connected with epidemic diseases."

Again, the author remarks that "The diseases caused by attacks of Fungi may be propagated by direct contact, or by the diffusion of the minute spores through the atmosphere. When we reflect on the smallness of the spores, the millions produced by a single plant, and the facility with which they are wafted by the wind in the form of the most impalpable powder, we can easily understand that they may be universally diffused and ready to be developed in any place where a nidus is afforded. Perhaps some of the diseases affecting man and animals may be traced to such a source, In order to prevent these diseases which affect the corn crops, it has been proposed to steep the grains in various solutions previously to being sown. For this purpose, alkaline matters and sulphate of copper have been used. In all cases the seed should be thoroughly cleansed. Smut and pepper-brand have been averted by these means. In the case of the latter, diseased grains are easily removed by being allowed to float in water, and the grains which remain are washed with a solution of lime, common potash, or substances containing ammonia, which form a soapy matter with the oil in the fungus. A weak solution of sulphate of copper acts by destroying the fungus."

Other processes have been used to prevent the diseases produced by Fungi, as the kyanizing and burnetizing of wood to prevent the dry-rot, which is the result of an attack of *Merulius lacrymans*. Creosote and a solution of Pyrolignite of Iron have been also used for the same purpose. In the description of the natural order *Umbelliferæ*, are the following observations, which are very important, as illustrating the effect of climate and soil upon the properties of plants. Thus:—

"In regard to the poisonous species of this order there is still much to be learned. They appear to vary according to the soil and climate in which they grow. Some species, generally reputed poisonous, have been found by Dr. Christison to be quite innocuous when gathered from localities in the neighbourhood of Edinburgh. *Œnanthe crocata*, and a variety called *apiifolia*, have been long looked upon as poisonous. The roots have been mistaken for parsnips, and fatal effects have been thus produced. It would appear, however, that these poisonous qualities are not invariably present, for Dr. Christison found that the roots of this plant, when growing in a sea-side locality, near Edinburgh, were innocuous. It remains to be determined if the climate and locality have any effect in modifying the properties of the plant. The same remarks may be made in regard to *Œnanthe Phellandrium*, and *Cicuta virosa*, which seem to vary as regards their poisonous qualities."

In conclusion, we strongly recommend this work as a valuable Manual of Botany for the use of all classes of students.

THE RUDIMENTS OF BOTANY; *a Familiar Introduction to the Study of Plants.* By ARTHUR HENFREY, F.L.S., &c., Lecturer on Botany at St. George's Hospital. London: John Van Voorst, 1849; pp. 249, with Illustrative Woodcuts.

Mr. Henfrey's *Rudiments of Botany*, is also admirably adapted to the object which he appears to have had in view in writing it; but we cannot do better than make a quotation from the preface, to explain the design of the work. The author says, "The *Rudiments of Botany* have been prepared with the intention of furnishing those inclined towards the study of Plants, with a simple and practical introduction to the Science. For this purpose, the style has been made as familiar as possible, and the examples referred to, chosen from well-known plants; technical terms of course occur in considerable numbers, since Botany, like every Science and Art, requires that particular names should be applied, in an exclusive sense, to particular things; but no more of these have been introduced than are absolutely necessary at the commencement

of the study, and the student must submit to the necessity of taxing the memory with a few new words." Again he says, "Many points often included in introductory works are omitted in the present, as it seemed to the author preferable to include only what is necessary for the beginner to know, and to state this clearly and briefly in a general sketch of the characters of plants. It may suffice for those who do not wish to make a deep acquaintance with the Science, or at all events serve as an useful ground-work for more extensive studies."

In pursuance of these designs the work is divided into five chapters. The first contains a few introductory remarks on the object of Botany, and a general view is taken of the outward characters of a plant, and the offices they fulfil in the life of the vegetable. The second and third chapters treat of the various Organs of Flowering Plants, and the fourth is devoted to a general description of the different tribes of Flowerless Plants. In the fifth chapter a description is given of Systematic Botany, and it contains a very good account of the method to be pursued in ascertaining the name of a plant, and other particulars respecting it, by the System of Linnæus.

We can bear testimony to the great merits of the work as thus designed; and considering it admirably adapted for general use in Collegiate Institutions, and indeed for all those who are commencing the study of Botany. We rarely find so much information contained in so small a volume; and from this fact, it might also serve to refresh the memory of those who already possess some knowledge of Botany, and have not time to read more comprehensive works.

A Few Suggestions on Consumption. By Robert Hall, M.D., &c. &c. London: Churchill. Norwich: Stevenson and Mitchell. Small 8vo, pp. 138.

This is a medical work, and as such we shall not presume to review it. But it is written in a popular style, and in one respect deserves a Pharmaceutical notice. The author points out forcibly the evils of the drenching system as thwarting the curative efforts of nature, and gives a practical caution to Chemists respecting the *responsibility* of prescribing over the counter for patients suffering from disorders of the lungs, and especially deprecating the general use of opium in cough mixtures.

A Grammatical Introduction to the London Pharmacopœia, *and a Key to Physicians' Prescriptions, or the Dispenser's Hand-Book*, containing a Latin Grammar, &c. &c. By S. F. Leach, Classical Professor. 4th edit. London: H. Hughes, 15, St. Martin's-le-Grand. 12mo., pp. 263.

We recommended a former edition of this little book, and have no reason to retract. It is a Latin grammar applied to Pharmacy, the illustrations being taken from the Chemists' shop. It is likely to be particularly useful to the student preparing for examination, and also as a book of reference to the dispenser.

The Literary Register and Almanack for 1850. By J. W. G. Gutch, M.R.C.S., &c. &c. London: David Bogue, Fleet Street.

This is a scientific pocket-book, containing a great diversity of information in a condensed form, with blank leaves for memoranda. We have recommended it annually to those who carry a pocket-book, and have only to add that it fully sustains the character it has acquired.

Sanitary Economics; *or our Medical Charities as they are, and as they ought to be.* By Alexander P. Stewart, M.D., &c. &c. London: James Nisbet and Co. 8vo, pp. 30.

Report of the Chinese Hospital at Shanghae, *from July* 1st, 1847, *to December* 31st, 1848. By the Committee.

TO CORRESPONDENTS.

C. H. v. *Studius.*—Guibourt's *Histoire des Drogues*, of the new edition of which two volumes have been published, price 27*s.*

C. D. H.—Red ink. ℞ Brazil-wood, ℥iv. ; alum, ℥ij.; Distilled-water, Oij. Boil for a quarter of an hour and strain, then add Gum Arabic, ℥j. Mix and bottle it for use.

Blue Fire.—℞ Nitre, five parts; sulphur, two parts ; metallic antimony, one part. Mix.

A Registered Apprentice.—(1.) *Gold ink.*—Mix finely divided gold-leaf with thin gum-water.—(2.) For preserving pencil marks apply a thin solution of isinglass in water.

Alpha.—The "zinc plates" used in galvanic batteries are made of zinc, the surface of which is amalgamated by rubbing some mercury over it.

L. S. D.—The price of an hydraulic press, such as that described in Redwood's *Practical Pharmacy*, would be about £20.

G. Y.—Marine Cement.—The formula is corrected in the second edition of Gray's Supplement as follows: "Digest from two to four parts of caoutchouc, cut into small pieces, in thirty-four parts of coal-tar naphtha, promoting solution by the application of heat and by agitation. To the solution when formed, and which will have the consistence of thick cream, add sixty-two or sixty-four parts of powdered shellac, and heat the mixture over the fire, constantly stirring it until complete fusion and combination has been effected. Pour the mixture while still hot on plates of metal, so that it may cool in thin sheets like leather.

"In using the cement, put some of it into an iron vessel, and heat it to about 248° Fahr., and apply it with a brush to the surfaces to be joined."

Tyro.—The boiling point of acetic acid is higher than that of water ; hence the reason that on distilling vinegar a portion of the acid will remain in the residue unless it be distilled to dryness.

P. R.—The ventilator would, no doubt, lessen the evil.

C. R.—Linseed-oil may be decolourized by treating it with chromic acid.

J. R.—Wood and Bache's *Dispensatory*, and O'Shaughnessy's *Bengal Dispensatory.*

J. L.—Coal-tar naphtha is a solvent for gutta percha. The Gutta Percha Company have a machine for covering their insulated wire.

An Associate.—Oxalic acid is most generally used for bleaching leather. Sulphurous acid would probably be better.

J. F. (Mile End).—For bleaching bladders, a dilute solution of chloride of soda.

H. H.—We believe Bohnenburger's single leaf electroscope is used for the purpose.

Galenus.—(1.) The specimen is galangal root.—(2.) Crystals of chloride of potassium or sodium are frequently deposited in old extract of conium.—(3.) Powder the camphor and mix it with the chalk. By the plan suggested most of the camphor would evaporate in the process of drying.

Mr. Bate.—We repeat that there is no *authorised* formula for camphorated chloroform. The form suggested may answer very well, *viz.*, chloroform, ℥j. ; camphor, ℥ss. ; dose, m. v.

X. Q.—Most tinctures will keep for a long time unimpaired. We are not aware that they improve by keeping.

A. P. S. (Exeter.)—Goddard's price-book is the best we have seen.

A. P. S.—Liquor Taraxaci is prepared by each Chemist according to his own method, It is, therefore, not uniform. We think the following is the best formula:—℞ Expressed juice of taraxacum, three parts ; rectified spirit, one part ; mix, and allow the mixture to stand for twenty-four hours. Then decant and filter.

J. T. S.—We have no formula for Leeming's essence for lameness in horses.

Omega.—We have no means of ascertaining when the work will be completed.

Nemo.—The class of perfumes alluded to are made by private formulæ, which the makers are careful to keep to themselves.

Mr. Horne (*Erratum*).—In alluding to the formula for Vin. Ferri, last month, we inadvertently quoted P. L. 1836 instead of 1824.

C. K. (Liverpool).—The proposal to register the sale of poisons has been for some time under discussion.

A. P. S. (Taunton.)—Balfour's *Manual.*

Editorial Puffs.—We have received the communication on this subject, and agree with the writer in the opinion that "Good wine needs no bush."

M.P.S.—We have repeatedly defined the distinction between medical practice and what is called counter practice.—See vol. iv., p. 245; vol. viii., pp. 505 and 544. A Chemist sueing a patient for payment for medical treatment, including medicine, would not be likely to get a verdict, and might establish a case against himself for the Apothecaries' Company to finish off.

We have received Dr. Sheridan Muspratt's flowery article in the *Liverpool Journal* for December 1st, some portions of which are but a step from the sublime. His allusion to the "withering silence of contempt," would be a fearful cut if it were not inconsistent with itself, as the allusion disturbs the "silence."

Mr. Bostock (of Clapham), informs us that he has been served with a writ for selling Gregory's Stomachic Powder without a stamp. Probably the remarks, p. 299, will serve to explain the case.

A Correspondent (Leeds) recommends a licence of £5 per annum as a means of promoting the respectability of the Chemists as a body. We think this is too much by £3 19*s.* If *all the regular Chemists in the country* would join the Pharmaceutical Society (all future Chemists being obliged to pass the examination), the object would be attained at an expense of one guinea per annum from each.

Mr. Atkins (Poole) sends the following formula for Incense:—℞ Pulv. Casar ℥ij; Myrrh, Styracis, Benzoin, Cassiæ, Thuris, Picis Abietis. āā ℥j M.

F.B.B., *A.P.S.*—The explanation suggested is no doubt correct, the glycion being precipitated by the free acid in the sweet spirit of nitre.

M.P.S. We know of no cheaper formula than that referred to, for making valerianate of iron.

X. (1.) There is no authorized formula for solution of sulphate atropia.—(2). It is carbonate of lime.

(The following were omitted in a former number):

An Enquirer (Birmingham).—The apparatus alluded to, is described and figured in Redwood's *Practical Pharmacy*, pages 60 and 61.

R. E. Mistura Camphoræ Concent., containing myrrh and soda, cannot properly be used in dispensing.

Mr. Nicholls gives the following for removing grease, &c.: ℞ Liq. Ammon., ℥ij; Pot. Subcarb., ℥ij; Saponis Mollis, Sp. Tereb. āā ℥j. M. Dissolve the potash and soap in the Liq. Ammon., then add the Sp. Turpentine.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the EDITOR, 338, Oxford Street, before the 20th of the month (if Answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. IX.—No. VII.—FEBRUARY 1st, 1850.

THE PROFESSIONAL CHARACTER OF THE PHARMACEUTICAL CHEMIST.

Our attention has been directed to certain disreputable advertisements and quack medicines issued by a member of the Pharmaceutical Society, who styles himself "a Member by Examination." Inquiries have been made in several quarters whether the assumption of the title be a fraud upon the public, or whether this individual may be taken as a fair specimen of the "Members by Examination?" These are serious questions. In candour we are bound to admit in answer to the first, that his statement is correct. He was a pupil at Bloomsbury Square, and he was admitted as a member after having passed the Examination. But in justice to the students in the Laboratory who were his associates or who are his successors, in justice to the Society of which he is unfortunately a member, we are equally bound to state that this is the first instance of a man coming forth from the School of that Society, and pandering to the vices of the public by the circulation of advertisements too obscene for publication in our pages, and after the model of those issued by the most degraded quacks, which the editors of respectable newspapers refuse to admit at any price.

In order to sustain the professional character which *primâ facie* is supposed to result from liberal and scientific education, public opinion expects an observance of certain rules of propriety, a neglect of which is inconsistent with the character implied in the qualification. In a majority of cases, the enjoyment of a creditable position in society induces a degree of self respect which operates as a check against unworthy conduct. A man who feels conscious that a false step may precipitate him from a position which he has gained at the expense of many years of toil and study, is naturally more scrupulous and circumspect than one who has no character to lose.

Unfortunately there are exceptions to this general rule, and it is well known that even the College of Surgeons, a body whose antiquity and high character would justify, if not demand, a rigorous observance of the established rules of professional propriety, is disgraced by the conduct of some of its members. We frequently see the name of the Royal College of Surgeons figuring conspicuously on disreputable handbills, posted on walls in obscure corners of the streets, side by side with the obscene bills of quacks and impostors of the lowest order. It is not our business to inquire why the College has taken no steps to suppress this disgraceful exposure, but the analogy between the two cases is so striking, that they may properly be mentioned together, when the principle involved in them is under consideration.

It is quite certain that if "members by examination" are to start in business as rivals to Dr. Eady and Mr. Leake, and no notice is to be taken of such proceedings, the Pharmaceutical Society may hide its diminished head, and the "professional character" of its members will become a bye-word, only to be mentioned in derision.

Fortunately the Charter of Incorporation contains a special provision which may be made available for checking abuses of this description, but we forbear to enlarge further at present, as we trust the subject will be duly discussed elsewhere.

THE ADULTERATION OF CHEMICALS.

In another part of this number will be found a further exposure of the chemical frauds, respecting which we have already had occasion to caution our readers. The preparations which are now the subjects of these frauds, demand the most scrupulous care and accuracy, both in the manufacture and in the administration; and when we consider the alarming and fatal consequences likely to ensue from the circulation in the trade of fabricated articles of this description, we think no apology is required for bringing the subject prominently forward.

Let us consider for a moment the probable result of the adulteration of a morphia salt with fifty per cent. of sugar or other inert substance. The manufacturer sells his preparation at less than the prime cost of the genuine article; he either obliges the honest manufacturer to sell at a loss, or he drives him out of the market. The wholesale purchaser of the fabricated salt sells it to the retail Chemist, who supplies it to his customers. A patient finds that the desired effect is not produced, and he increases the dose until relief is obtained. He procures a supply at another shop where the preparation is genuine, and consequently double the strength; he takes the same quantity, which produces an alarming effect. We have known many instances in which patients have been nearly poisoned in this way, not only with opium and its preparations, but also with prussic acid, extract of colocynth, and other powerful medicines. The first impression on the occurrence of such a result, is, that the Chemist who has sold a genuine article is suspected of having made a mistake, and this odium rests first on him and then on his wholesale druggist, until the offence is traced to its source. Sometimes the real offender is never brought to light, and the innocent suffer in character for the fraud which has been practised upon them.

Whenever it comes to our knowledge that any manufacturers are systematically pursuing this dishonest course, and inventing some fresh adulteration, as soon as each in succession is found out we shall fearlessly publish the fact for the benefit of the trade, the medical profession, and the public. We are fully aware that this is a delicate subject, and that some of our Members misinterpret and misunderstand the object of such exposure. Within the last month a Member of the Society at Bristol took offence at the letter of Mr. Barnes, respecting the adulteration of white precipitate, because it contained an assertion of a wholesale Druggist that he kept the said compound for "*Country customers* who would not pay the price of a genuine article." It is not stated that the country customers are Chemists, and the remark only applies to such Chemists (if there be any) who will not pay the price, &c. Our friend having a very "thin skin," put the cap on his own head, thought himself insulted, and resigned his Membership!

Probably, he will on reflection become sensible of his error, and open his eyes to the fact that by the exposure of an adulteration, a benefit is conferred on all parties except the perpetrator of the fraud, who has brought disgrace on himself.

The adulterations to which we are alluding, as well as those published in recent numbers of this Journal, have been traced to their sources. At present we confine ourselves to the statement of the facts; but if the parties should persist in the system, and fresh cases should come to our knowledge, we shall without the least hesitation publish their names.

We advise any Chemist who may find that he has been *wilfully* imposed upon in this manner, to bring the case before a magistrate.

THE PROHIBITION OF THE SALE OF STILLS BY BROKERS AND OTHERS.

In consequence of the extensive manufacture and sale of illicit spirit, mentioned in our last number, the following general order has been issued by the Board of Excise:

GENERAL ORDER.

Inland Revenue Office, Old Broad-street, London,
10th January, 1850.

It being enacted, by the 9 and 10 Vict., chap. 90, sec. 4, that every Still, or Still-Head, or Worm of a Still, shall be forfeited which is found in the custody or possession of any Person in England not being known as a regular Maker of Stills, or not being a Licensed Distiller, Rectifier, or Compounder of Spirits, or Vinegar Maker, or Licensed, or by the Commissioners of Excise permitted, under the provisions of the said Act, to keep or use a Still; and it appearing that complete Stills, such as are used by private Distillers, are constantly kept or exposed for sale by Brokers and others not being Persons as above described;

Ordered,—That the several Officers of this Revenue take notice hereof; and that such Division and Ride Officers in England, as have Brokers residing within their respective Stations, call upon and inform them that they cannot have any Still, or Still-Head, or Worm of a Still, in their custody or possession, without the same being liable to be seized or forfeited.

By the Board, George Ballard.

THE SUPPLY OF WATER TO THE METROPOLIS.

Since the departure of the cholera, the water supply has been the great sanitary question in the metropolis. It is generally admitted that the supply is deficient in quantity, more or less impure, and charged at too high a rate. To remedy these defects several embryo companies are in the field, and all interests are clashing and contending in the struggle.

It is rumoured that the Government proposes to supersede all aspirants, and to place the water supply and the sewage of London under the management of a Government commission. We know what the Commission of Sewers has been, and from this we may surmise what the proposed commission would be. The parish authorities are loud against this scheme, and equally loud against the "Water monopoly." The cry is, "Parochial and representative management—no joint-stock companies."

The term "water monopoly" originates in a delusion. Whatever monopoly exists is in pipes, and in the privilege of stopping up thoroughfares to lay down and repair the same. Any man may sink a well, fill his bucket at a river, filter his water, and carry it to the top of his house. Whether any man, or any company of men, should be allowed to break up the streets, is a public question, depending on the amount of benefit the public will derive by way of compensation for the inconvenience. Whether *an unlimited number* of men or companies can afford to incur this expenditure, is a question of pounds, shillings, and pence, depending on the probable return for the outlay.

While the parochial boards are declaiming against the principle of joint-stock companies at public meetings, individuals belonging to these boards are supporting, some one new company, some another, all denouncing monopoly, and each endeavouring to get what all denounce. One company has gained over a large party by the

specious proposal to place the management in the representatives of the parochial boards, looking to "private enterprise" for capital. It remains to be seen whether they will find capitalists ready to consent to the conditions. We rather suspect that this proposal is merely used as a ladder to carry the company into a committee of the House of Commons—but no further. Whatever may be the result of the agitation, one thing is certain, namely, that a large amount of capital will be required. If the parish authorities are to undertake the task, they must either borrow the capital or make arrangements with the companies. If the present companies are to be superseded, they must either be bought up or opposed. The result of a competition may be predicated from past experience. After a few years of ruination to the competitors on both sides, either they will amalgamate, or the longest purse will win. In the former case, the public will ultimately pay the piper in the form of an increased water-rate.* In the latter the odds would be against the parishes, as the companies are strong, united, and well-backed; the parish representatives being wafted about by currents and under-currents, and having only borrowed capital, would fall to pieces.

On reviewing the entire question apart from clashing interests, the following facts forcibly strike us.

The companies have what the parishes want, namely, capital, plant, and experience. The companies enjoy privileges on the express condition that they will confer a corresponding amount of benefit on the public. If they have not fulfilled this condition they may be compelled to do so by Act of Parliament. Whatever defects exist, either in the source of supply or general arrangements, can be remedied as easily by them as by any other means. The admission of any new companies into the field would be a waste of capital, the interest on which would be added to the water-rate. Whatever additional outlay may be required, could be done by means of capital raised by the companies by the issue of new shares, and the wants of the public might be secured by the following provisions:—1st. The water to be derived from sources approved by a committee of scientific men. 2nd. The water to be filtered. 3rd. Every house (except those having wells or other private means of supply) to be supplied with high service at a charge not exceeding a certain rate to be agreed upon, and the assessment to be levied on the same principle as the poor-rate. 4th. The amount of dividends payable to shareholders to be limited. 5th. The power the companies possess of suing new tenants for the debts of their predecessors, to be abrogated. Certain minor regulations for reducing the expense of the management might be added, and probably some two or three companies might be amalgamated to reduce the waste of capital. We doubt whether a better and more economical plan could be contrived by the parishes, as we observe that among the parish authorities there is "much cry and little wool," while the companies have plenty of "wool"—or rather "gun-cotton"—ready to explode at the word of command when the fight begins.

With these brief remarks we dismiss this branch of the subject, as that which comes especially within our province is the quality of the water, on which some information will be found in another part of this number.

* The water-rates were raised fifteen per cent. above their former amount in consequence of the competition some years ago.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

THE CONVERSAZIONE.

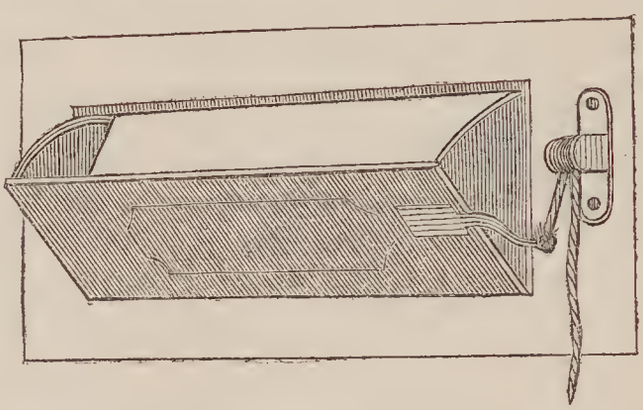
On Wednesday evening, the 16th of January, a Conversazione was held at the house of the Society, as announced in the last number of this Journal. The reception rooms were opened at an early hour, and continued well filled until near midnight. A great number of objects of interest to scientific men, and especially to Pharmaceutists, were displayed on the occasion, which served as topics of instructive conversation throughout the evening. In one room the tables were nearly covered with rare and interesting specimens selected from Dr. Pereira's collection of Materia Medica, which is about to be added to the already well-stocked museum of the Society, and which will render this unquestionably the most complete museum of the kind in existence. Among the objects of the above class was a specimen of East Indian Senna which had been grown at Bombay, by Dr. Gibson. The leaves, in this specimen, are as perfect as those of Tinnevelly senna, but they are smaller. They have evidently been carefully collected and preserved, and are quite free from adulteration. The specimen was sent for the museum of the Society by Professor Royle, of King's College. There were also on the tables several valuable specimens which have recently been presented by Mr. Hanbury, jun., of the house of Allen, Hanbury, and Barry, consisting of the dried plant (*Crozophora tinctoria*) which yields the colouring matter called *Turnsole*, together with the coloured rags (see page 308 of the last number of this Journal); the plant, with root, fruit, &c., of *Smilax aspersa;* the true resin of *Abies excelsa*, &c. These specimens were collected by Mr. Hanbury himself during a recent tour through the South of Europe. There were also specimens of the olive and of *Phytolacca decandria*, presented by Mr. Alsop; resin of benzoin by Mr. Burman; hog gum by Dr. Hamilton; Indian metallic bottle, in which otto of roses is imported, and mannite or purified manna, a beautiful crystalline substance recently imported, and recommended as a substitute for common manna. The last-named substance is sold by Mr. E. Read.

Crystallised acetate of copper from Mr. Morson; olibanum from Mr. Nobrega, of Madeira; bark of *Asclepias gigantea*, Chinese alum, specimen of white lead, illustrating its manufacture, white cassava root, lemon grass, &c., from Dr. Pereira; a beautiful specimen of garden Patna opium from Mr. Dickinson of Cambridge Street; gun-cotton which had undergone decomposition from Mr. Tustin of the London Hospital; fruits of senna and tephrosia from Mr. James Martin.

Among the specimens of apparatus exhibited was that recently adopted by Regnault for the analyses of gases, and which he has employed in his elaborate investigations on the respiration of animals, which was kindly lent by Professor Graham; also Graham's Diffusion Cell, for experiments in liquid diffusion, which was presented to the Society (see page 379). Mr. Griffin exhibited a very compact and most efficient medico-galvanic coil machine, a gas furnace, some of his alkalimetrical tubes graduated with extreme accuracy by machinery, and a microscope, which combines all the requisites for pharmaceutical

microscopic investigations at a small cost. There were also several other microscopes presents, supplied by the President of the Society, by Mr. Bentley, the Professor of Botany, and others. Among the objects exhibited by the microscope were some of the bodies which have been found in the evacuations of cholera patients, respecting which there has been so much discussion in the medical journals, and which have been alluded to in this Journal under the head of cholera fungi.

Mr. Sheringham exhibited a model of his ventilator, to which allusion was made in the last number of this Journal (p. 303), and of which the following is a description:



"A flap, with quadrant ends at right angles to it, is constructed to fit into a frame in the form of a parallelogram; to each lower corner of the flap is a pin, which pin works in corresponding sockets at the lower corners of the opening of the frame. The flap, by mechanical arrangements, is susceptible of being thrown outward to an angle of about sixty degrees, or pulled up to any less angle, or the opening may be entirely closed by the flap, when it is desired to do so: one line for the regulation of all the above operations is brought within reach of the hand.

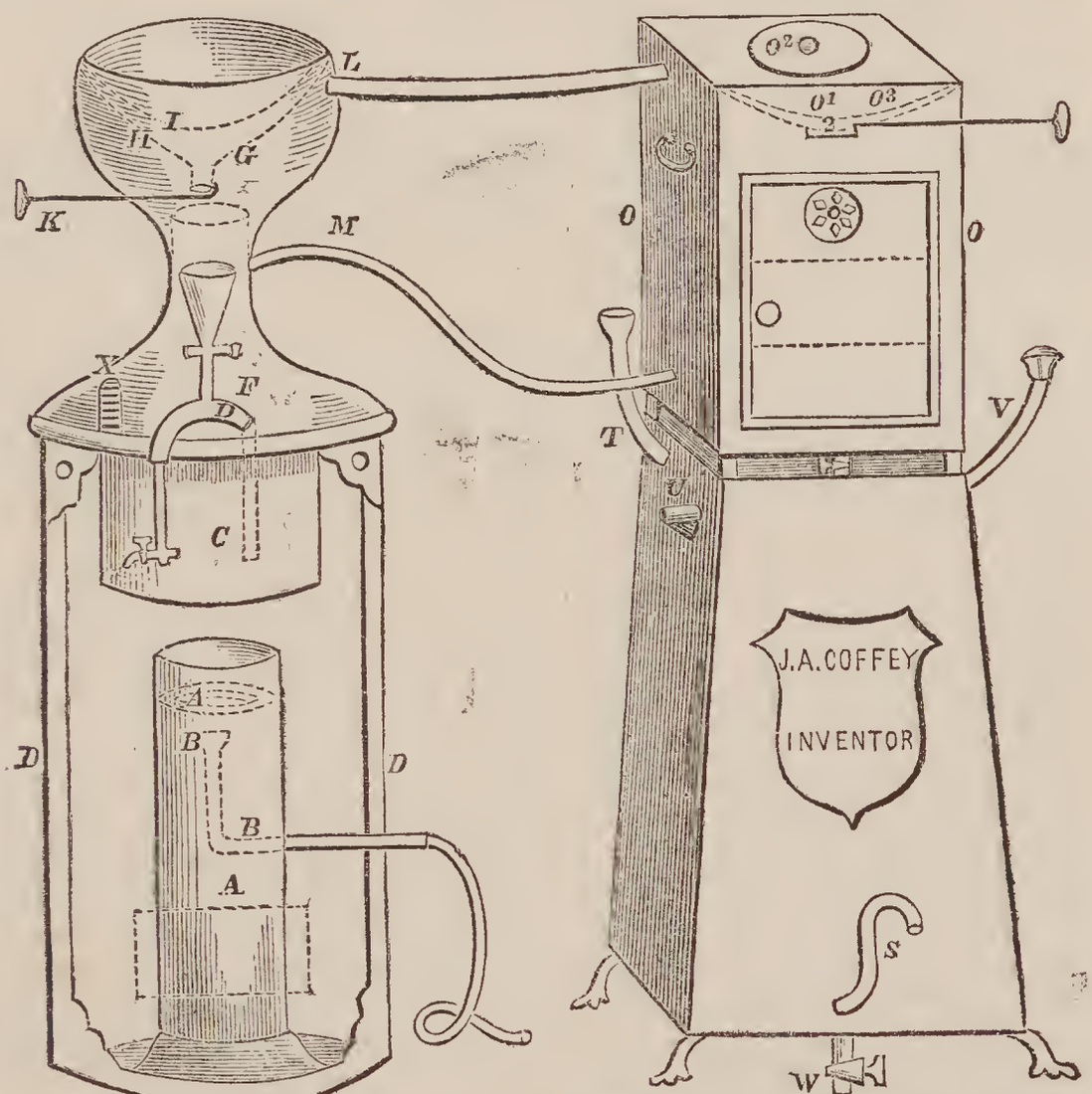
"The flap proposed for a room about ten feet square is about nine inches long by about three inches deep, working in a suitable frame.

"A perforation is to be made in an external wall, fully as large as the ventilator, the upper part of which should be from four to eight inches below the ceiling of the apartment to be ventilated. Mr. Sheringham's ventilator may then be fixed in the opening from within, so that the flap of the ventilator, when pulled into the frame, may be on the same plane as the inner surface of the wall. The whole face of the ventilator may be papered or painted in the same manner as the piece of wall which is removed for its introduction, but so that the flap may fall freely within the room whenever an inlet of air is desired. If the dimensions or nature of the interior to be ventilated require a larger opening than can be externally closed by an air brick, or if the position of the building to be ventilated appears to demand an especial provision against the entrance of soot or other natant substance in the atmosphere, an iron frame, covered with perforated zinc, or gauze wire of adequate fineness, may be substituted for the air brick. The size and number of the ventilators will be regulated by circumstances.

"It will be found that the oblique direction which is given to the flap of the ventilator, when opened, will induce an upward direction to the incoming current of air admitted by it, and that this upward direction will be retained a sufficient length of time to enable it to become warmed, and dispersed through the warmer air within the apartment before it reaches the occupants, and hence there will be removed from such incoming current of air, in sufficient time, all the injurious characteristics and tendencies of a cold current of air, frequently, and *frequently severely*, felt

from an open window; the 'Sheringham Ventilator' will, therefore, remove all the objections arising from a *descending supply of air*, which is so clearly shown in Dr. Reid's *Rudiments of Chemistry*, published by Messrs. Chambers in 1848, to result from the entrance of air from upward perforations for the admission of air for ventilation heretofore in use."

In one of the laboratories Mr. Coffey, of 19, Sidney-street, Commercial-road, exhibited what he calls his *Esculapian Still and Condensing Apparatus*, which is intended to afford to the Pharmaceutical Chemist the means of conducting the processes of ebullition, distillation, evaporation, desiccation, &c., on the small scale, by the heat of a gas-furnace. The following cut represents this apparatus.



B, a burner supplied with gas by a flexible tube. *C*, the boiler, or still. *I*, an evaporating pan fixed over the boiler and forming the top of the still-head. *K*, a valve for shutting off the steam from *I*, when it passes through the tube *M*, otherwise it would pass through *L*, and communicate heat to the drying-closet *O O*, and from thence to the condenser *T T*. O_2 is a second evaporating pan over the drying-closet.

In the lecture-room, Mr. Redwood gave a variety of illustrations, principally in relation to dia-magnetism, with his great electro-magnet.

EVENING LECTURES.

Mr. Redwood concluded his Lectures on Electricity and Magnetism on the 9th of January. This, and the preceding lecture on the 2nd of January, were occupied with the subject of electro-magnetism, including the discoveries recently made by Faraday and others in relation to the influence of magnetism on all matter.

Dr. Pereira commenced his Lectures on the Applications of the Microscope to Pharmacology, on Wednesday evening, the 23rd of January.

SUPPLEMENTARY DIGEST OF THE CORRESPONDENCE ON THE SALE OF POISONS.

The number of members to whom the questions were sent was—in the country, 1240; in London, 360—total, 1600.

The number who responded was—in the country, 853; in London, 140—total, 993.

The number of Answers to the first question—"Do you sell Arsenic?" was—affirmative, 761; negative, 82.

In almost all cases where sold by Chemists, precautions are adopted as stated in the first report of the committee. These precautions comprise a strict inquiry as to the purpose for which it is wanted, who are the parties requiring it, &c.; and not unfrequently registration in the presence of witnesses, as provided in the following clause in the Manchester and Stockport local Acts:—

"And be it enacted, that every person who shall sell arsenic or prussic acid* to any person apparently under the age of twenty-one years, or to any person whatever, except in the presence of two witnesses, and without correctly entering in a book the name and address of such witnesses and person purchasing, as well as the quantity purchased, and the purpose for which it is intended, shall forfeit a sum not exceeding five pounds, to be recoverable as any penalty imposed by this Act."

It is stated by correspondents in that neighbourhood, that this precaution appears to answer the purpose, no cases of poisoning by arsenic being reported. In the manufacturing districts opium is the poison most in requisition, and the fatal results of "child's cordial" cannot be estimated with any degree of accuracy.

It has been already stated that the purposes for which arsenic is ostensibly demanded,† are numerous, comprising various manufacturing and legitimate purposes, in some of which it is used in very large quantities. The entire prohibition of the sale of arsenic is therefore out of the question. The retail sale is not confined to cases of poisoning vermin, but extends to other purposes, some proper and legitimate, others quite the reverse. Among the latter may be mentioned the use of arsenic by candle-makers and grooms. Some grooms administer it to horses under the absurd idea that it makes their coats fine and glossy, by which practice horses are occasionally poisoned.

With regard to the question whether arsenic is sold by grocers, oilmen, and general dealers, some correspondents state that they are not in possession of positive evidence on this point; but the information afforded is sufficient to shew that this evil exists to a considerable extent. Some correspondents have alluded in forcible terms to the

* In the year 1846 it was proposed to add the words "or any other known deadly poison" to the Stockport local act then before Parliament; but on a representation that this would seriously interfere with the regular business of the Chemist, the objectionable words were withdrawn.—See Vol. V., p. 535.

† By colour and chemical manufacturers, farmers, flockmasters, veterinary surgeons, shipwrights, glass manufacturers, candle-makers, dyers, braziers, whitesmiths, bird-stuffers, gamekeepers, gardeners, grooms, whitewashers, painters, firework-makers, rat-catchers, housekeepers, and others of all classes (see the last number, p. 302.)

mischief resulting from the facility with which arsenic may be obtained from small shops in the country towns and villages.

The most important question on the list is "Would the prohibition of the retail sale of arsenic be in your opinion desirable?" The replies to this question may be thus classified:—

In the Country—			
Yes	401	No	202
Favourable to restrictions or regulations, 209			
In London—			
Yes	108	No	17
Total Yes	509	Total No	219

Neuter—In the Country, 31; in London, 15; total, 46.

Many of the answers are simply Yes or No; in others, reasons are assigned. Of these reasons, some on each side are equally positive; some who are in favour of the prohibition never sell it themselves, and consider it useless and unnecessary; others only sell it for fear of offending their customers who require it, and would be glad to be released from the responsibility, by the answer that the retail sale is illegal. On the other side, the demand in some localities appears to be so great, that the prohibition is considered impracticable. It is also urged that the prohibition would answer no good purpose, as the criminal or the suicide, if deprived of one poison, would soon find another, and, in all probability, one more objectionable, because less easy of detection. Some ridicule the idea of the prohibition, observing that ropes and razors might with equal propriety be included. Although a large majority consider the use of arsenic for poisoning vermin unnecessary and improper, others assert that it is indispensable, deny the efficacy of any known substitute, and state that rats and other vermin could not be kept within bounds by any other means. At Maidstone and some other places, we are told that arsenic is generally used for poisoning mice, as the gamekeepers shoot all the cats in the neighbourhood. The recent *battue* in Paris, in which 250,000 rats were killed, gives some idea of the extent to which these animals multiply; and it is affirmed that even if phosphorus paste answered as well, the expense would place it beyond the reach of farmers, who, not having sewers adapted for the purpose of a *battue*, have no resource but poison. It is reported that on one farm upwards of 40,000 rats were killed during a year by means of arsenic. This, however, must be admitted to be quite a secondary consideration when compared to the sacrifice of human life by the indiscriminate sale of so dangerous a substance. Many correspondents are of opinion that if proper care were exercised in the sale of arsenic the danger would be comparatively small; and, among the regular Chemists and Druggists, it is an undoubted fact, that judicious precautions are generally adopted, and in many cases considerable tact and discrimination exercised, by which numerous crimes and accidents have been prevented.

The nature of the answers appears to be the result of individual experience and local circumstances, and as these are various and opposite, so also are the opinions. It will be observed that the proportion of Yes and No in the country is about two to one in favour of the

prohibition. In London it is as six to one—the retail demand for arsenic being much more common in the country than in London.

In answer to the eighth question, "How many cases have occurred?" &c., about a hundred cases are reported, but more than half the number did not occur within the last twelve months. Statistically, this information is imperfect, and it is scarcely to be supposed that a complete and accurate return could be obtained from any known source. Among the cases reported, the following are selected as examples. All the cases are authenticated, but the names are purposely omitted. As the information was understood to be confidential, only such use has been made of it as to answer the desired object, without in any degree compromising the parties concerned.

A young lady having applied in vain to several Chemists' shops for some arsenic, at length obtained what she believed to be the article required. She went home and swallowed it, and repenting of what she had done, confessed the fact. On inquiry, it was found that she had swallowed cream of tartar.

A boy was served in a similar way, but a drop of croton oil was added to his dose. He immediately confessed, a consultation of doctors took place, the Chemist was summoned, and all parties were relieved from anxiety.

The following is another case:—"A young man in my neighbourhood came last Whitsuntide for a quarter of a pound of arsenic to dress a horse's leg, stating that his master had sent him. His master had an open account with me, but from the looks of the man I suspected that he did not want the arsenic for any good purpose, and told him to fetch a witness. He brought one; I registered the object for which he wanted it, and gave him a quarter of a pound of Creta ppt. He went home, gave part to his father in a glass of ale, mixed some with the horses' food, then took the rest himself and thought he was going to die. His wife came to me to ask what he had taken, I told her not to be alarmed."

It may be stated as a general rule to which there are some exceptions, that when a person has taken poison, the first impulse of the mind is the desire to be saved, and the dread of death experienced during the period of suspense is an effectual cure for the propensity to commit suicide.

A small quantity of arsenic having been sold to a custom-house officer with an especial caution, he took it home and put it on the table. During his absence from the room for a few minutes, one of the children, about two years old, smeared its mouth over with it. The child's life was saved, but almost destroyed by the medical remedies, &c.

We are informed that there is a woman (at Chelmsford) in gaol waiting her trial for attempting to poison her husband with white precipitate.

Nux vomica was introduced into a "batch cake" and sent to the intended victim, but the bitter taste prevented a sufficient quantity being taken to endanger life.

Flour which had been mixed with arsenic for poisoning rats was used in a plum-pudding: three persons partook of it, but only one died.

In another case arsenic was given to a child by mistake instead of magnesia.

A girl, eleven years of age, obtained arsenic from an apothecary and swallowed it mixed with water.

Of three cases of attempted suicide by nux vomica, two proved fatal; in the third, the person anticipated the result by cutting his throat.

Children have been poisoned by eating starch mixed with oxalic acid by straw-bonnet cleaners.

In some districts we are told that laudanum and oxalic acid are more frequently resorted to as poisons, than arsenic.

Cases of attempted suicide by laudanum are numerous, but the attempts are said to have been often frustrated by timely remedies.

A correspondent mentions three cases of attempted suicide by laudanum, the fatal effects of which were averted; and observes that in his neighbourhood the Medway is generally preferred by suicides.

More than one case is reported in which persons obtained a pennyworth of laudanum at several shops, swallowed the whole, and died.

A captain applied for half an ounce of chloroform and was refused. At another shop he obtained it, and also half an ounce of prussic acid. He was found dead the next morning with the phial (prussic acid) empty in his hand. The correspondent who reports the above, and who refused to sell the chloroform to the captain, was formerly in the habit of selling arsenic and keeping a register of the sales in a book, for which he was highly complimented on one occasion in a court of justice. However, he found this very troublesome, and it sometimes offended his customers. He therefore discontinued the sale of arsenic altogether, as well as oxalic acid.

Among the accidental deaths from arsenic, several are reported to have occurred in consequence of the incautious use of the poison in domestic utensils, or from carelessly leaving it in packets or jars in improper places. Several persons are reported to have declined the purchase of arsenic when told that they must sign their names in a book in the presence of witnesses. One man, on cross-examination, confessed that he wanted the arsenic not to destroy human life, but to be revenged of his master. It was ascertained that he had previously been convicted by a magistrate of poisoning his master's fowls. Several of the cases of criminal poisoning are those which have been published and discussed in the newspapers.

The use of arsenic for dressing sheep is so extensive, that it is difficult to deal with this branch of the subject. Some substitutes have been suggested, but rather theoretically than practically. Many farmers carry a lump of corrosive sublimate in their pockets, with which they rub the part affected, wetting it with saliva. This does not supersede the use of arsenic, nor is it much more suitable as a pocket companion.

In some parts of the country, sulphate of copper has taken the place of arsenic for steeping wheat, in others it has been tried and failed. There is reason to believe that the failure has arisen to a great extent from the adulteration of the salt, which is frequently retailed to the farmers at a price less than it can be sold wholesale by the ton when genuine. Three samples were examined by the committee, one of which contained a large proportion of sulphate of iron, quite sufficient to account for the failure of such a compound. The price in general bears a definite relation to the quality; but the farmers, not knowing the difference, purchase the cheapest. The adulterated sulphate has generally a dingy greenish tint; but a correspondent in Essex states that he has seen some which had a bright blue colour, an ammoniacal salt having been added to improve its appearance.

In some counties arsenic is but little, if at all, used for steeping wheat, sulphate of copper being found to answer the purpose quite as well. Some think it more efficacious, and consider the additional cost compensated by its superiority over arsenic. This is the case in some parts of Scotland, where economy is generally an important consideration. In Essex the use of sulphate of copper is very general, and is gradually superseding arsenic. It is difficult, however, in some places to overcome the prejudice in favour of arsenic, but when the farmers can be induced to give the sulphate a fair trial, they give a

favourable report. Of this, several instances are stated in the correspondence. The prejudice in favour of arsenic for agricultural purposes may probably be overcome by degrees, by disseminating information as to the superior efficacy of other agents; but this will of necessity be a work of time.

The report respecting the number of accidents resulting from the use of arsenic for sheep-dressing and for steeping wheat, is not sufficiently complete to possess any statistical value. The Chemist who sells the arsenic in a market-town, is many miles distant from the places where it is used, and therefore imperfectly acquainted with the result. Nevertheless, several serious cases have been reported, in which human life has been sacrificed, and many others relating to horses, cattle, fowls, &c., and the facts stated are sufficiently conclusive as to the danger arising from the agricultural use of arsenic.

The last question, respecting the sale of poisons generally, by oilmen, grocers, and general dealers, has been only partially answered, some correspondents declining to reply to it for want of positive evidence. In the answers from 98 towns it is stated, that drugs, including poisons, are sold in the towns, and also in the neighbouring villages. The evils resulting from this traffic in dangerous substances by ignorant persons, are forcibly pointed out, and many correspondents doubt the efficacy of any law relating to the sale of poisons, unless comprising a provision for the education of all persons professing to be Chemists and Druggists.

A correspondent at Leeds states that among the regular Chemists and Druggists, the practice of requiring a witness is generally adopted, while hucksters and quacks sell arsenic and other poisons without any precautions or restrictions. Several correspondents allude to the great mischief which arises from the ignorance and recklessness of the quack doctors who frequent the markets. It would appear that any precautions adopted by Chemists in country-towns would be of little avail, so long as the candidates for poison on failing to obtain it of a Chemist, need only go to a neighbouring village, and without a question being asked the article is supplied.

Among the numerous suggestions for a means of protecting the public against the dangers arising from the sale of poisons, there are few which have not been already discussed. Various forms of registration—a licence—the appointment of a limited number of persons in each town as dealers in arsenic—written orders from medical men, clergymen, or magistrates—the mixture of arsenic with some substance to disguise it—and other expedients of this nature, are severally suggested as likely to produce some effect. But the only comprehensive proposition from which a radical remedy could be anticipated, is the restriction of the retail sale of known deadly poisons to medical men and chemists. This proposition is strongly urged by a large number of correspondents, and it is based upon facts and arguments which admit of no denial, at the same time it is perfectly obvious that until the term Chemist and Druggist is defined by Act of Parliament, and associated with a compulsory examination, the proposed restriction would be inoperative. It would in fact be worse than useless, since any person desiring to sell poisons might write Chemist and Druggist over his door, introduce the coloured bottles into his window, and enjoy the privilege.

The circumstances and habits in different localities are so dissimilar, that it is extremely difficult to contrive any prohibitory regulations

which would be generally appropriate and practicable, unless founded on character, qualification, and respectability.

On a review of the entire correspondence with the facts reported, the committee are of opinion,—

1st. That with regular Chemists and Druggists proper precautions are generally adopted, and very few accidents occur.

2nd. That the unrestricted sale of poisons in general, by unqualified persons, is the great source of danger.

3rd. That the total prohibition of the sale of arsenic is impracticable, and inconsistent with the requirements of legitimate trade.

The Committee have received the following communication—

ON THE SALE OF POISONS;

With some Statistical Returns of Suicides, Accidents, &c.

BY W. T. FEWTRELL, ESQ.

Before you adopt a report on the subject of the sale of poisons, I beg to call your attention to some facts showing, I think, the *benefits* of a limited sale of them. It occurred to me, from what I have seen at this institution, that although poison is more frequently resorted to with a view to self-destruction than any other means, it least often proves successful: and I think the following figures will prove the truth of this. I have gone through the Registrar-General's reports for the years 1846-7 and 8, and found the number of suicides committed in London by various means in those years to be as under:

	Wounds by fire-arms, cut throats, and stabs.	Drowning.*	Hanging and Strangling.	Poison.
1846	74	136	103	47
1847	84	144	86	54
1848	92	125	85	61

In the same years the number of *attempts* by similar means brought to the London Hospital were as follows:

	Wounds.	Drowning.	Hanging.	Poison.
1846	6	0	1	26
1847	2	0	0	27
1848	6	2	0	27

Of these one of the wounds in each year proved fatal, as did one case of drowning in 1848. Of the poison cases three died in 1846, two in 1847, and one in 1848. Unfortunately our registers do not enable me accurately to separate the suicidal from the accidental poisonings. I think that only two-thirds of them can fairly be put down as attempts at suicide; and I know that two of the deaths in 1846, and one in 1847, were the results of accidents, which will reduce the number of successful attempts to only one in eighteen made by means of poison.

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* If any one should take the trouble to go through the Returns after me, he will see that the violent deaths, suicides, and accidents, are all returned together under the heads I have given. In the wounds, hanging, and poisoning he will have no difficulty in separating these according to the verdict. But with the drownings a difficulty occurs. The number of bodies found drowned without evidence to show how they came into the water is very great, and in deciding on these I have adopted the following plan: All sailors, watermen, &c., working on the water I have classed as accidental. (I do not see why these should not drown themselves intentionally, but I thought it best to class them as above.) All children under the age of sixteen I have put down as accidents. If my memory serves, there are one or two under that age reported as suicides; but such cases must be very rare. All grown up females, and all males unconnected with the water, I have classed as suicides.

I would have continued the statistics for the year 1849, but since the cholera broke out the Registrar-General has ceased to publish the Coroners' returns. The gross number of poisonings in the past year was eighty-three.

Now the first thing that strikes one, looking at the figures I have given, is the small number of wounds, &c., brought here for relief—when, as we see from the Registrar-General's reports, more suicides are committed by those means. The reason I take to be clear—attempts made by those means are more successful. A man firing a pistol at his head, cutting his throat, or leaping from a bridge, immediately places recovery beyond possibility ; but, as we often see, another who swallows arsenic or oxalic acid, when the symptoms of poisoning begin to be developed, gets in imagination a glimpse of the Valley of the Shadow of Death, is scared at the prospect, and is the first to give the alarm and send for a medical man.

The choice of means by a person bent on self-destruction is determined by a variety of things—the temperament, education, and circumstances of the individual among the rest. A strong-nerved determined man might look into the anatomy of the neck first, to make sure of dividing the carotid artery—while a timid sensitive individual would endeavour to slip painlessly and unconsciously out of existence by the aid of laudanum. People in the last stage of poverty usually resort to the water, and medical men or persons in some way connected with the profession have always enjoyed a monopoly of prussic acid for the purpose. Now I do not think it is too much to assert that a man, determined on self-destruction, if prevented from using one method would adopt another, and this, I think, should be taken into consideration before legislating on the subject. "Where there is a will there is a way," says the proverb. If you can make it impossible for any one to buy sufficient poison to destroy life, you only drive a person who has made up his mind to do so to other, and as we have seen, more fatal means. And he has not far to look for these. It struck me on reading through the reports that every man walks about with—

"Death in his rear, and murder in his van;"

to alter slightly an elegant line by the Rev. R. Montgomery, who has busied himself in this matter—or, to speak less poetically, with the most fatal instruments of self-destruction about his person, *viz.* a handkerchief in his coat-tail, and a penknife in his breeches-pocket. An attempt to deprive people of the use of these would of course be laughed at. But any address to the legislature to restrict the sale of poisons might very reasonably be accompanied by a recommendation that the bridges should be converted into cages like the gallery round the Monument, and that the banks of the Thames and Regent's Canal should be pallisaded as those of the New River are through Islington. The barbers too might very appropriately petition Parliament to restrict the use of razors to their craft.

Unprofessional people write and talk on this matter as though they imagined Druggists had a direct interest in encouraging poisoning. But in truth the very reverse is the fact. Looking at it in the lowest point of view—the commercial—no sensible Druggist would sell a man a pennyworth of arsenic to destroy himself, when, if the same man lived, he might buy many ounces of Epsom salts. But any one may make these reflections for himself, and I will only trespass further on your patience to suggest, that those who object to the sale of even small quantities of laudanum, should teach people how to get ease by other means. Those also who object to the retailing of oxalic acid should instruct the public how to accomplish the various purposes to which that article is applied, with as little trouble and at as little cost, by other innoxious matters.

I think I ought to have given the number of accidental poisonings. They amounted in 1846 to 32, in 1847 to 41, and in 1848 to 24. Not many of these were by substances usually taken for suicidal purposes. Several of them are animal poisons; among the rest are "over-doses of medicine," ammonia given to cure intoxication, money, soft soap, soap liniment, syrup of poppies, whole pepper, Epsom salts, gin, and cold water !

London Hospital, January 14, 1850.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES
(*Continued.*)

ELECTED IN JANUARY.

MEMBERS.

ALTON	Atkins, Joseph	High Street
ALTRINCHAM	Hughes, Edward	Market Place
ASHBURTON	Gillard, Thomas	North Street
AXBRIDGE	Hallam, Edward	West Street
CLIFTON	Blundstone, John	1, Mall
CHELTENHAM	Power, John Henry	114, High Street
EDINBURGH	Ainslie, William	58, George Street
GLASGOW	Murdoch, James	78, Buchanan Street
GRANTHAM	Hall, Thomas	West Gale Street
LONDON	Cox, John	3, Rye Lane, Peckham
LOUTH	Robson, John	
OTTERY ST. MARY	Parsons, John	Cornhill
PENDLETON	Taylor, Sydney	Broad Street
ROME	Sinimberghi, Nicholas	Italy
SALFORD	Barker, Jun., Robert	34, Greengate
TIVERTON	Beedell, Thomas P.	Fore Street

MAJOR EXAMINATIONS.

Allchin, Alfred	Coles Terrace, Islington
Glanfield, George	Colchester
Sinimberghi, Nicholas	Rome

MINOR EXAMINATIONS.

Alexander, William	Peckham
Burman, William K.	London
Caley, Albert Jarman	Maidstone
Fleurot, Emile	Mauritius
Goode, Charles	Congleton
Kershaw, George	Hitchin
Russell, Charles J. L.	Maidstone
Stubbs, George	Darlington
Wheeler, Francis	Northampton

REGISTERED APPRENTICES.

APPRENTICES.	RESIDING WITH	TOWNS.
Amos, Daniel	Mr. Holttum	Canterbury
Anderton, John	Mr. Lowe	Liverpool
Bailey, Henry	Mr. Perdue	Bexley Heath
Coates, John T.	Messrs. Mills and Co.	Bakewell
Dawson, Henry	Mr. Banks	Camden Town
Donington, Robert	Mr. Shudford	Spalding
Foote, Henry	Mr. Brown	Belper
Hagger, Alfred	Mr. Schacht	Clifton
Hains, Parton John	Mr. Lloyd	Highgate
Heap, Edward	Mr. Wylde, James	Manchester
Hickling, William P.,	Mr. Hodder	Bristol
Kershaw, Joseph	Mr. Howarth	Manchester
Noble, Francis R.	Mr. Brown	Oxford
Pollitt, James	Mr. Shawcross	Stockport
Reeve, Edward	Mr. Reeve	17, Calthorpe Place
Scatcherd, James	Mr. Ward	10, Everett Street
Tasker, William	Ditto	Ditto

BRISTOL PHARMACEUTICAL ASSOCIATION.

REPORT OF A LECTURE ON THE GASES.

BY F. W. GRIFFIN, ESQ.

We regret that we are unable, in our limited space, to publish this lecture, which was delivered in December last, to a very full meeting of the Association. It is a remarkably good lecture, giving a clear and concise view of the subject. The lecturer commences by pointing out and illustrating the relative properties of solids, fluids, and gases, with some practical remarks on steam and the elements of water. In discussing hydrogen, he alludes to the occasional presence of arsenic in this gas, arising from the impurity of the oil of vitriol employed, a fact which cannot be too forcibly impressed on those who are engaged in experiments on this subject. He treats of the specific gravity of gases, the inflammability of some of them, and the application of this property as a source of light, describing the Bude light, coal-gas, &c. Carbonic acid is also described minutely, with the effects of this and some other gases on the respiratory organs. Other gases are noticed, and their several properties pointed out, especially those which are applicable to the purpose of deodorising or disinfection. In conclusion, Mr. Griffin expresses his desire to promote, by every means in his power, the prosperity of the *School of Chemistry* in the "metropolis of the west;" and gives notice that, on the 1st of March, he will commence an extended course of lectures on the Theory and Applications of Chemistry and the Allied Sciences, profusely illustrated with experiments, models, and natural and artificial specimens, in which he will take peculiar care to dwell on all points connected with the practical applications of the science, whether in a manufacturing, social, or domestic point of view.

ORIGINAL AND EXTRACTED ARTICLES.

EAST INDIAN SENNA.

BY DR. ROYLE, F.R.S., &c.,
Professor of Materia Medica at King's College.

I send you a specimen of the senna grown by Dr. Gibson, and with which he has supplied the military hospitals; the surplus, amounting to 17 cwt., he has sent to this country, to see how it will answer the purposes of cultivators there and of purchasers here. We all know that Alexandrian senna is much adulterated, and it is almost sure to continue to be so, for the demand is much greater than the supply, and thus this is likely to be with the distant carriage on camels before it reaches the banks of the Nile. The African and Arabian senna, which reaches us by the way of Bombay, and is called East Indian senna, is not appreciated here, though genuine and pure, because it is not carefully gathered nor clean picked. The Tinnevelly senna, however, which was grown from Arabian seed, holds the first place in the market, because it is well grown and carefully picked. Many years since I grew senna in the Saharunpore Botanic Garden, both from Baya senna-seed, and from some seed sent me by Sir Charles, afterwards Lord Metcalfe. Both the seeds produced

the same species, which I have figured in my *Illustrations of Himalaya Botany*. The senna was pronounced by Dr. Twining, after using it in the General Hospital, equal to the best. The same kind of senna has again been tried in the hospitals at Saharunpore, as I myself had done before sending it to Calcutta. Dr. Bolton who submitted the garden senna to this second set of experiments at Saharunpore, pronounced it equal if not superior to the senna of commerce, acting without griping, and forming an excellent purgative. It was determined in consequence that the Government hospitals should all be supplied with senna grown in the garden, when a planter in the neighbourhood of Agra offered to produce it in the required quantities, and of equal quality, near Agra. Dr. Gibson has however for some years been growing it in the Bombay Presidency for the public service there, and where the senna is equally well approved of. By the small specimen you will see in the form of the leaves that they are those of the true officinal senna. The colour is good, and the leaves have been carefully picked. They are smaller than those of Tinnevelly senna, being grown in a drier climate, that of the Deccan.

THE ADULTERATION OF MURIATE OF MORPHIA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

My dear Sir,—In my note to you, published in the last number of your Journal, I stated that salicine was the substance used in the recently detected adulteration of muriate of morphia. I had come to that conclusion from a hasty examination of the adulterated salt, relying principally on the oil of vitriol test; but a more careful examination to which I was subsequently led by the supposition that a manufacturer, disposed to adulterate, would employ a less costly article than salicine, has convinced me I was in error, and that sugar was really the substance employed. This correction, although unimportant in a commercial point of view, calls for a few remarks with reference to the detection of sugar under such circumstances. The perfect similarity in colour of the reaction of oil of vitriol on the salt containing sugar as compared with that produced when salicine is present, renders this test unavailing as a means of distinguishing the two substances named when mixed with the morphia salt; nor is it easy to detect the sugar by its taste, in the mother-liquor resulting from the decomposition of the salt by ammonia, as the presence of a little muriate of ammonia completely masks the sweet flavour. This latter salt probably also affects the process of fermentation in estimating the sugar in that way, for it was found that the alcohol obtained from a specimen of the adulterated salt, represented little more than half the quantity of sugar presumed to be present.

On the other hand, the detection of salicine offers no difficulty. It is simply necessary to precipitate a solution of the suspected salt in four times its weight of water at a boiling temperature, with very slight excess of ammonia, to filter while hot, and to concentrate the filtrate, when the salicine will crystallise out, being sparingly soluble in cold water.

The adulterated salt has been in the London market for more than twelve months, although its real character was not known, and I have ascertained that several hundred ounces of it have been *recently* sold.

Yours truly,
T. N. R. Morson.

19, *Southampton Row, Russell Square.*
January 24th, 1850.

[We have received from Messrs. T. and H. Smith of Edinburgh, for publication, a copy of correspondence between themselves and Mr. M'Farlan, in which the latter gentleman fully exonerates Messrs. Smith from any participation in the morphia frauds.

The publication of the correspondence is quite unnecessary, as Messrs. Smith were never suspected. The real offenders are known, and do not reside in Edinburgh.—Ed.]

CONCENTRATED TINCTURE OF CAPSICUM, A REMEDY FOR CHILBLAINS AND TOOTHACHE.

BY A. TURNBULL, M.D.

At this season few diseases are so general as chilblains, and the plans that are generally employed for their removal are seldom attended with more than very slight advantage to the sufferers.

It is a disease that attacks most generally females and delicate children, and those of a languid circulation. The very numerous and various medicines which have been from time to time employed, prove very clearly that no very effective or successful plan of treatment has hitherto been found. Such is the present state of treatment both of chilblains and toothache.

My plan of treatment is simply to saturate a piece of sponge or flannel with the concentrated tincture of capsicum, and to rub well over the seat of the chilblains until such time as a strong tingling or electrical feeling is produced. This medicine possesses an extraordinary power in removing congestion by its action upon the nerves and circulation.

This application ought to be continued daily until the disease is removed; relief will be experienced on the very first application, and frequently there will be a total removal of the disease after the second or third. This of course depends upon the severity of the case. This embrocation when rubbed, never produces excoriation if the skin is not broken.

The manner of using it for toothache, is by putting a drop or two of the tincture on cotton, and applying it to the part affected—the relief will be immediate. The following is the formula:—

Tinctura Capsici Concentrata.

℞ Capsici Baccarum, ℥iv.
Spiritus Vini Rect., ℥xij.

Macera per dies septem et cola.

It may also be made with advantage by displacement.

16, *Manchester Square, Jan. 17th*, 1850.

ON THE D'AMBA, OR DAKKA, OF SOUTHERN AFRICA.

BY WILLIAM F. DANIELL, M.D.,
Assistant Surgeon to the Forces, &c.

The *Pharmaceutical Journal* for September, 1849, contained a brief notice, extracted from the *Journal de Pharmacie*, of a plant commonly used by the negroes of the Kongo and Angola, and designated under the European title, "Tobacco of the Congo."

As this vegetable production apparently enjoys a wide geographical range in that portion of the African continent to the southward of the equator, the native tribes inhabiting both the inland and maritime regions of these countries, are tolerably well acquainted with its properties, and this knowledge, as I shall subsequently prove, extends so far to the south, as to nearly embrace all the Hottentot and Kaffir races, resident on the borders, and even within the territorial precincts of the Cape settlements. Since, therefore, its local cultivation is not exclusively restricted to the kingdoms on the Rio Zaire or Kongo, I cannot altogether recognise the propriety of the preceding term, which has been conferred on it, and more so since the same appellation would have been more appropriately bestowed on a species of *Nicotianum*, abundantly reared by the inhabitants of those districts to which the former is indigenous, and which the Kongoese might readily confound with it, if the plant was demanded by the white trader by that name.

During a residence of many months in several of the provinces of the Kongo and Angola, I frequently observed that the principal supply of this article was brought from a great distance inland, by the slave Kabookas or kafilas to the European factories on the coast, and upon inquiry, found that it constituted no unimportant item of the interior traffic, independent of its value as a useful remedial agent, and one that was highly esteemed from the circumstance of its supporting the strength and condition of the slaves when on the long and toilsome marches towards the place of their embarkation. The D'amba possesses numerous native titles, but it is only understood by those distinctive terms which the negroes give it in their respective countries. By the people of Ambriz and Musula, it is pronounced as D'yambah, while to the various races in Kaffraria, it is more generally known under the Hottentot name of *Dakha* or *dacha*. Although the greater portion of this vegetable consumed by the natives of the coastal districts is chiefly derived from the interior, yet it is also occasionally cultivated by them, and may be noticed growing in a wild state on the wastes or neglected farms of the bushmen. The specimen now forwarded was procured from a small plantation on the banks of the Rio Ambriz, near the town of Kincolo.

This plant, a variety of the *Cannabis sativa* or common hemp, is evidently the same production so extensively cultivated by the Dongós, Damaràs, and other tribes to the southward of Benguela.

In the river Zaire, the D'amba flourishes in several localities adjoining the town of M'bomma, and also in the provinces of Sognio on the left bank of the same stream, where it may sometimes be seen growing amid the native plantations of mandioca. From the fact of its having been discovered in many solitary and unfrequented places,

the inference has been drawn, that it was indigenous to this part of the Kongo, and although experience to a certain degree tends to support this supposition, yet there is a greater probability that it has been introduced from central countries at some remote period, and has eventually become naturalized to these regions of Western Africa. Among the Ambundas, or aborigines of Angola, the dried plant is duly appreciated, not only for its narcotic effects, but likewise on account of some medicinal virtues which it has been reputed to enjoy. The markets of St. Paul de Loanda are mostly supplied from the Dongós, and other adjacent tribes, and from St. Salvador and the towns in the vicinity of the upper Kongo, all of which maintain to a greater or lesser extent, a lucrative commercial intercourse with the Portuguese settlements near the ocean.

The Kongoese usually sow the seeds of the Cannabis previous to the commencement of the rains in March, and as vegetation rapidly increases during their continuance, the young shoots soon arrive to the height of five or six feet. When the racemes and seeds have attained the proper maturity, the plant is cut down and allowed to remain on the ground for a few days to dry in the sun. If not required for immediate use, it is suspended on the beams or roof within their huts. The mode in which it is prepared for sale, consists in carefully separating from the leaves and seeds, the larger stalks, retaining only the smaller stems, which are compressed into a conical mass, varying from two to four inches in diameter, and from one to two feet in length, the whole being covered by some dried vegetable firmly secured by thin withes. The substance thus manufactured, is ordinarily employed for the purpose of smoking, and is endowed with powerful stimulant and intoxicating principles, consequently it is proportionately prized by those nations who are familiar with these peculiar qualities, and is probably viewed more in the light of a luxury, owing to the absence of other sources of excitement, for which, perhaps, it was the only available substitute.

Though the inhabitants of Ambriz seek with avidity the solace of this preparation, they nevertheless appear to employ it in moderation, and are not so passionately addicted to its influence as the other native tribes, they therefore, suffer less from those pernicious effects which are known to result from the intemperate indulgence of it. The aboriginal method of smoking this narcotic, consists in fixing the clay bowl of a native pipe into the centre of a large gourd (as in the annexed sketch) and passing it to each individual composing the community, who in succession take several inhalations of the smoke, which is quickly succeeded by violent paroxysms of coughing, flushed face, suffused eyes, and spasmodic gestures, with other symptoms indicative of its dominant action on the system. Upon the subsidence of this temporary excitement, the party experience all those soothing sensations of ease and comfort, with that pleasing languor stated to constitute the potent charm, that renders it in such universal request. If the inhaling process is carried beyond this stage, inebriation shortly supervenes. As the too frequent employment of this plant must induce considerable

bronchial irritation, with repeated attacks of pulmonary congestion and inflammation, emaciation as a necessary sequence gradually ensues, while a premature decrepitude of frame, conjoined with serious organic affections of the lungs, insidiously steals onward, and under the mask of phthisis, finally terminates the existence of the victim.

The Gangars, or native doctors of Ambriz, sometimes medicinally resort to the D'amba, under the form of an infusion, combined with the *Abrus precatorius*, and various astringent barks, as a remedy to check gonorrheal discharges. The Hottentots and bushmen smoke the leaves of this plant, either alone or mixed with a little tobacco, and as they generally indulge to excess, invariably become intoxicated. The European settlers have been stated to foster this inordinate propensity by cultivating the plant for their especial gratification, in order to retain them in their service. The Bechuanas have a very curious method of smoking the dakka, which has been mentioned by a recent traveller. "Two holes, the size of the bowl of a tobacco-pipe, are made in the ground about a foot apart; between these a small stick is placed, and clay moulded over it, the stick is then withdrawn, leaving a passage connecting the two holes, into one of which the requisite material and a light is introduced, and the smoking commenced by the members of the party, each in turn lying on his face on the ground, inhaling a deep whiff, and then drinking some water, apparently to drive the fumes downward."*

The Cannabis appears to have been well known to the ancients from a very early period, and has been alluded to in the writings of Herodotus, Galen, Avicenna, and others. According to authors of a modern date, the peculiar action of the preparations obtained from this plant are supposed to resemble

> "That nepenthes which the wife of Thone
> In Egypt gave to Jove-born Helena."

It would be unnecessary here to enter into any further details connected with this subject, as it has been fully treated of in the works of several able writers, who have given ample descriptions of this plant.

CINCHONA CALISAYA.

BY M. H. A. WEDDELL.

Specific Characters. — Leaves oblong or lanceolate—obovate, obtuse, attenuated at the base, rarely acute on both sides, smooth, polished or pubescent beneath, scrobiculate in the axils of the veins. Filaments usually shorter than one-half the length of the anthers. Capsule ovate, scarcely equal in length to the flowers. Seeds frequently fimbriate-denticulate at the margin.

a. Calisaya vera. A tree, with obtuse oblong-obovate or oblong-lanceolate leaves.

β. Josephiana. A shrub, with somewhat acute, oblong-lanceolate or ovate-lanceolate leaves.

Cinchona Calisaya, Wedd. *Ann. Sc. Nat.* x. 6 [*Pharmaceutical Journal*, vol. ix., p. 232, for November, 1849.]

Hab. Bolivia and Southern Peru.—(v. v.)

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* *Life in the Wilderness, &c.*, p. 38.

a Calisaya vera.—A tall tree. Trunk straight or bent, naked, not unfrequently twice the thickness of a man's body. The leafy head (*coma*) for the most part elevated above all the other forest trees.

Bark of the trunk thick. The periderm mostly thicker than in other species of the genus, easily separable from the liber, and, when separated, exposing on the surface of the latter, furrows or impressions resembling carvings; furnished with vertical parallel fissures, and transverse, more or less, annular scissures; whitish or also blackish. Periderm of the branches whitened or variously marbled by the thalli of lichens; and marked by rather sinuated fissures and narrower scissures. Bark of the branchlets thin, smooth, and brownish olive-coloured or blackish. It grows in declivities and steep and rugged places of the mountains, at an altitude of from 1500 to 1800 metres, in the hottest forests of the valleys of Bolivia and Southern Peru; between 13° and 16° 30′ south latitude, and from 68°to 72° west longitude; in the Bolivian provinces of Enquisivi, Yungas, Larecaja, and Caupolican; and in the Peruvian province of Carabaya. It flowers in April and May.

The bark is commonly called indiscriminately by the Spaniards and Indians, *Cascarilla Colisaya*, *Calisaya*, or *Culisaya*.

β Josephiana.—A shrub from two to three metres high, with a slender branched trunk of from three to five centimetres thick. Branches erect. Bark adhering firmly to the wood; that of the trunk and branches schistaceo—blackish, smoothish, or furnished with different lichens and marked in an annular manner by some narrow, distant scissures: that of the branchlets reddish brown.

Observations.—It is to this species that we are indebted for the most valuable of the barks employed in medicine ; it is that met with in commerce under the name of Calisaya bark, but of which the botanical origin has, up to the present time, remained unknown.

Notwithstanding the different explanations given by various authors, the etymology of the word *Calisaya* is yet very obscure. M. de Humboldt thought it was derived from the name of the province from whence the principal part of the produce was obtained ; but well-informed residents in that country have assured me that no province of that name ever existed there. However, in the department of La Paz, where the bark is most abundant, it more frequently is called *Colisaya*, or *Culisaya ;* and I am disposed to think that these names have been given to it on account of the red colour which the surface of the stripped bark assumes when dried, or perhaps from the colour sometimes presented by the leaves. In fact, in the Quichua language, *Colli* signifies " red," and *saya* means " kind," or " form." The red Indian corn is called *Colli cara*, or *Culli* only. I have said that this tree has only been met with in Peru, in the meridional portion of the province of Carabaya. The results I have arrived at in endeavouring to determine with exactitude the circumscription of its regions,* are sufficiently curious to be mentioned here. After having studied this bark in the whole of the ancient province of the Yungas of La Paz, to the north of 17° south lat. ; I then traced it into the province of Laracaja, or Sorata, from thence to Caupolican, or Apolobamba, the locality where it was first discovered. But on arriving in Peru it was no longer to be met with beyond the confines of the valley of Sandia ; and, notwithstanding the great pains taken for its discovery, I was unable to trace it any farther north than these points. Here, then, was an appa-

* There exists between the Bolivians and Peruvians a kind of rivalry on the subject of this produce. A report having been spread to the effect that the Cinchona Calisaya is only produced in the Bolivian territories, so that the barks collected in Peru, however good they may be, almost always fetch an inferior price, which necessarily is a subject of much vexation to the Peruvians.

Cinchona Calisaya.

A. Fructiferous branch. (From a specimen collected in the province of Carabaya, in Peru.)
B. Flowers (natural size)
C. Corölla laid open (magnified).
D. Capsule (magnified).
E. Seed (magnified).
F. Leaf of var. *Josephiana.* (From a specimen gathered in the province of Yungas, in Bolivia.)

rent barrier which the plant did not pass, although in appearance the adjacent valleys were of the same character. It is difficult to explain this circumstance, unless we suppose that the more meridional valleys of the province of Carabaya are in some way different from those of the north, and this difference may depend upon the particular distribution of the rivers. I believe, in fact, it may be stated that those of the district mentioned belong to a particular system, depending probably upon the Bolivian system; and those of the rest of the province belong, on the contrary, to the north of Peru, in the high Amazons. This inexplicable attachment which certain plants have for their native regions, and especially for valleys, is not without parallel; and as the study of botanical geography is becoming more generally cultivated, science will no doubt, become enriched with a greater number of analogous facts.

The great reputation of the Calisaya bark has made it so much sought after that it is becoming exceedingly rare, and there is no doubt that it will one day disappear almost entirely from commerce, and that we shall be obliged ultimately to be satisfied with one or other of the species we now despise. Already in the neighbourhood of inhabited parts, the tree is not to be seen, excepting as a shrub, and if perchance a small tree has remained unperceived in the midst of a forest, no sooner does it raise its head, than it is doomed to fall by the hatchet. When, for my purpose, I wished to see this species in all its vigour, I was obliged to spend long days on foot in the forests, traversing paths that were scarcely passable, and thus experienced some of the fatigues which are the common lot of the poor Cascarilleros.

The curious variety, which I have described under the name of *Cinchona Josephiana*, in commemoration of the name, too little known, of Joseph Jussieu, is called by the inhabitants of the country *Ichu Cascarilla*, or *Cascarilla del Pajonal*, names which both have a similar meaning (*ichu* in the Quichua language, and *paja* in the Spanish, signifying *herb*). I have long thought that this variety should constitute a distinct species; but a more careful study made on the spot has convinced me that it is only a particular form of the type to which I have referred it. I have little doubt also, that the districts in which it is found were once covered with forests, and that when these fell, no doubt by fire, the plant assumed this stunted form, resembling in this respect many of the Brazilian plants, which differ so greatly in size when found in the fields from that which they acquire in the forests. It is probable, therefore, that the cultivation of this cinchona would not succeed, unless the necessary conditions were provided for promoting the growth of the plant. It must, especially, be surrounded by other trees, which, growing more rapidly than itself, would afford a salutary shade during the first years of its existence. It has happened to me more than once, on the mountains of Tipoani, for instance, in passing from a *pajonal*, or meadow, to a cut wood, and thence to a thick forest, that I have seen the various modifications which the *Ichu Cascarilla* assumes in form and appearance. The colour and the texture of its different parts especially indicate the influence of the circumstances under which it grows. Here, the coriaceous leaves, with highly-coloured nerves, and stiff petioles; there, on the contrary, the soft and velvetty green leaves which distinguish the *Cinchona Calisaya*, and the flaccid petioles. Finally, when the summit of the adult plant rises above the neighbouring trees, its organs reassume some of the characters of the *Ichu Cascarilla*.

The characters by which the presence of *Cinchona Calisaya* is recognised in the midst of the forests are various; and many of them require that species of instinctive knowledge which is rarely met with excepting amongst those persons who have cultivated it all their lives. Every practical Cascarillero pretends to be able to distinguish the summit of one of these trees at a distance of nearly half a mile by the movements of its leaves.

This means of detection is the more easy when the tree is in flower or fruit, the colour of these being characteristic. In the forest the trunk is known at first sight by the appearance of its peridermis, which is sometimes of a greyish white, and sometimes brown or blackish, but always marked with longitudinal and close furrows or fissures, connected by transverse fissures, a character which is not met with in any other tree in these forests, with the exception of one or two of its congeners, and to a certain degree in the *Vichullo*, with which it is sometimes confounded. This aspect, however, is frequently hidden by the mosses and other parasites which more or less cover a large portion of the trunk, and in such case the oldest Cascarillero may be deceived. I have heard that a Cascarillero had fixed his tent for a long time against an enormous trunk of a *Cinchona Calisaya* without discovering it, and that another more skilful than himself did not hesitate to appropriate the spoil.

When the peridermis falls, the two faces of the dermis are of a yellowish colour, which soon turns to brown. The odour is then that of the bark of elder, but not quite so powerful. The taste is very bitter with scarcely any astringency, but having some degree of sharpness. The bitterness is felt on touching it with the point of the tongue.

Finally, from its external surface, especially when this has been bruised, there exudes a yellowish, gummy, resinous matter, sometimes rather milky, bitter, and astringent, to which the cutters ascribe the virtues of the cinchona. This matter is that which fills up all the cells of the dermis, and which escapes from fissures in the young bark. But it appeared to me, contrary to the opinion of the Cascarilleros, that it was less bitter than the juice of the inner surface of the bark. It stains the clothing of a dull red, and its presence influences the colour of the bark when dried. The Cascarilleros pretend that the abundance of milk, as it is called, which is greater in the bark of *Cinchona Calisaya* than in that of other species, retards its desiccation. It is especially from the effect of pressure that this juice becomes abundantly diffused over the surface of the denuded bark ; the bruised points may then be observed to assume a reddish colour, which is more intense as it has been immediately and more directly exposed to the solar rays. I have even seen some Cascarilleros irritate the whole surface of the denuded bark with a hard brush, in order that the colour might be uniform.

The consistence of the bark, when it is first taken from the tree, may be compared to the flesh of a mushroom, and it may be broken in any direction with the greatest facility. The Cascarilleros attach much importance to this character, which is the more marked as the quality is better. In the inferior barks, and especially in the false cinchonas, where the attachment of the cortical fibres exists to a greater extent, the transverse fracture of the dermis is effected more difficultly.

(*To be continued.*)

SOME ACCOUNT OF THE VEGETABLE IVORY PALM.

(*Phytelephas macrocarpa*).

BY SIR W. J. HOOKER.

It is not for the first time we here make the observation that the vegetable products, best known in commerce, in the arts, &c., are frequently the least known *botanically*. A striking example in proof of this statement may be found in the fact, that familiar as every one is with the substance called *Vegetable Ivory*, Dr. Von Martius is obliged to bring to a conclusion his *Opus Magnificum* on the Palms, without being able to figure, or even to describe from the life or from well-dried specimens, *the* species which yields this singular substance. The very last genus noticed in the work just mentioned, is *Phytelephas*, and the author concludes his account of it

with the remark: "Descriptio ex iconibus Gaudichaudianis et exemplari manco;" and these figures of Gaudichaud (*Voyage de la Bonite*) only exhibit the fructification, unaccompanied by any history or explanation.

We are far from expecting to fill up all that is wanting to the history of the *Vegetable Ivory*, our living plants are but young, and our own specimens, how superior soever they may be to those possessed by other botanical cabinets, are far indeed from being complete; for it is well known how difficult it is to procure available specimens for illustration of these "Princes" of the vegetable kingdom. The Royal Gardens, however, when sending out a collector to New Granada in 1845, did not fail to direct his attention to the importation of this plant; so that living specimens may now be seen in our stoves, and well-preserved specimens in various, but not in all states, in one of the cases of the Museum. From these, and from other sources, our brief history will be derived.

The first notice of the existence of the *Vegetable Ivory Palm*, was given by Ruiz and Pavon, in their *Systema Vegetabilium Floræ Peruvianæ et Chilensis*, published at Madrid, in 1798. There, under the name of *Phytelephas macrocarpa*, we find the following account of its native names and properties:—

"It is called *Pullipunta* and *Homero* by the Indians of the hot and low valleys of the Andes of Peru, about Chanchamoya, Vitor, Cuchero, and San Antonio de Playa grande, its native locality—*Palma del Marsil*, and *Marsil vegetal* by the Spaniards;—while the fruit, on account of its size and appearance, is called *Cabeza de Negro*. The Indians cover their cottages with the leaves of this most beautiful Palm. The fruit at first contains a clear insipid fluid, with which travellers allay their thirst; afterwards this same liquor becomes milky and sweet, and it changes its taste by degrees as it acquires solidity, till at last it is almost as hard as ivory. The liquor contained in the young fruits turns acid if they are cut from the tree and kept some time. From the kernel the Indians fashion the knobs of walking-sticks, the reels of spindles and little toys, which are whiter than ivory, and equally hard, if they are not put under water; and if they are, they become white and hard when dried again. Bears devour the young fruit with avidity."

This species, *P. macrocarpa*, is characterized by having a "short caudex and very large heads of fruit," which distinguish it from a second supposed species "destitute of caudex and with small fruit," *P. microcarpa* possessing the same native names and properties.

Humboldt next detected the palm in New Granada, especially common on the banks of the Magdalena, where it is known by the name of *Tagua*, and where, he tells us, "buttons are made from the hard bony perisperm of the seed." Gaudichaud, in the still unfinished Partie Botanique of the *Voyage de la Bonite*, devotes three plates to the illustration of the flowers and fruit of what he deems several species of *Phytelephas* of Peru and Columbia; but being, as we have already observed, unaccompanied by any observations, we are ignorant on what grounds he rests his distinctive characters.

At what period these seeds or "*nuts*" were first brought to England to be used by turners, &c., we have no means of ascertaining, nor to what extent they are now imported. MacCulloch, in his *Dictionary of Commerce*, and Dr. Ure, in his *Dictionary of Arts, Manufactures, &c.*, are alike silent. But from the use that is made of them, the amount is probably considerable, and in the turners' and toy-shops of London may be purchased, for a shilling each, the nuts, or more properly speaking the seeds, either entire, or with one-half of the coat removed by turning, so as to exhibit the beautiful ivory-like texture of the interior. The *entire* seeds thus purchased, had been planted in our garden; but they had never been made to germinate. Hence, all due instructions were given to Mr. Purdie when he

was sent on his botanical mission, some account of which is published in the *Companion to the Botanical Magazine*, and in relation to the *Phytelephas* or *Tagua* in particular, in the volume for 1847. We there learn that the palm inhabits dense shady woods on hills facing the Magdalena, in the province of Ocana, at an elevation of 1,000 to 3,300 feet above the level of the sea; never growing in hot plains or level country. At the season when the flowering takes place, the country is said to be scented with its fragrance, and when the fruit is advanced, all wild animals, especially hogs

Fig. 1.

Phytelephas macrocarpa.

and turkeys, are extremely fond of it. "Enclosing the seeds," observes Mr. Purdie, "is a yellow sweet oily pulp, which is collected at the proper season (October) and sold, under the name of *Pepe del Tagua*, for one real a pound, at Ocana. A spoonful of it, with a little sugar and water, makes the celebrated *Chique de Tagua*, said to be the most delicious beverage of the country.

Some idea of the beauty of this palm may be formed from our figure, taken from a drawing made and coloured on the spot by Edward Mark, Esq.,* H.M. Consul at Santa Martha, who obligingly communicated it for publication in this Journal.

The trunk, if trunk it may be called, is reduced to a short, nearly horizontal, and partially underground stem, or caudex, in our specimen about two feet long, but apparently very variable in size; and from the upper end of this arises a most graceful tuft of leaves twenty feet long, when fully grown, of a delicate pale green colour, and pinnated or divided like the plume of a feather. The plant is diœcious, the male and female flowers being on separate plants, the male surrounded by an entire spatha, while that of the female is torn into shreds as the fruit advances to maturity. Both the one and the other spring from the inner base or axils of the leaves in clusters, and are thus described by Martius:—

Masc. "Spadix specie simplex, cylindricus, pedunculo squamis nullis instructo, rache floribus densissime obtecta. Flores in prominentiis racheos brevibus (ramis decurtatis) arcta glomerati, bractea et calyce minimis, sæpe delitescentibus. Bractea ovata concava. Sepala tria: duo lateralia majora, bracteæ similia, tertium posticum illis tectum. Stamina numerosa (36) e thoro. Filamenta filiformia. Antheræ lineares, erectæ, fere basifixæ, biloculares, connectivo mucronulatæ. Pollen ellipticum, longitudinaliter sulcatum. Fœm. Spadix simplex, squamis compluribus spiratim dispositis obsessus, vertice flores nonnullos gerens, inter squamas absconditos, qui constant pistillo et staminibus numerosis illud cingentibus. antheris sterilibus. Ovarium subglobosum, loculis aut 5 (quoque 3 aut 6 ?) uniovulatis. Stylus terminalis, erectus, apice tripartitus, cruribus subulatis, unico simplici rariusve bifido, binis bifidis, divisionibus intus stigmatosis. Ovula —? integumento duplici. Drupæ nonnullæ in capitulum maximum ponderosum aggregatæ, depresso-globosæ, deorsum cuneato-angulatæ, subpentagonæ, muricato-tuberculatæ et maturæ crasso-corticatæ, tuberculis sursum majoribus, longitudinaliter fibrosis et in parte supra verticem fructus convergentibus, quadri- et quinque- (et 3- aut 6-?) loculares. Semina in loculis solitaria, e fructus angulis centralibus oblique adscendentia, hilo magno convexo cicatricoso, oblongo-obovata, introrsum bifacilia. Testa crassa, ossea, lævigata; membrana interna vasis ramosis percursa. Albumen osseum, solidum. Embryo periphericus, juxta hilum sub-basilaris. Germinatio per chordam elongatam remotiva."—*Mart. Palm.* p. 306.

As already observed, our flowering specimens are not perfect, for Mr. Purdie was at the spot during the more advanced state of the fruit, and was thence enabled to send a bountiful supply of excellent seeds; thus I am unable to confirm the accuracy of the description of the parts of the blossom. One male spadix which we possess exhibits a dense compacted mass of stamens, very much resembling the male flowers of *Freycinetia*; hence, probably, and from other peculiarities of structure, botanists have been led to refer the *Phytelephas* to *Typhaceæ* (Humboldt), others to *Pandaneæ* (Kunth, Endlicher, &c.), Ruiz and Pavon, Lindley, &c., to the *Palms*; while Von Martius, in his very recently published number of his Palms,

* To this hospitable gentleman our garden owes much of the success that attended Mr. Purdie's mission to the Magdalena.

remarks:—"Genus, pro distincti ordinis typo a me habitum (*Consp. Regni Veget.* p. 6) hinc Palmis inde Typhaceis et Pandaneis affine, a Gaudichaudio prioribus adjudicatum, quibus notis congruat, quibus differat et quo modo vicinis ordinibus nectatur, Botanicorum ulteriora studia docebunt;" and he places it along with *Nipa* (usually ranged under *Pandaneæ*) in a section of "Genera heteroclita; floris fœminei perigonio deficiente." Yet he does describe a floral covering, at least in the male flower.

The fruit of the *Phytelephas* will be considered of more interest by our readers than the flowers. It is represented at fig. 1 upon the entire plant, on a very reduced scale; and the young and perfect fruit (still upon a very reduced scale, about one quarter of the natural size, from specimens in the Museum of the Royal Gardens at Kew) together with the seeds, at our figs. 2 and 3. The size of our large fruits is ten inches across, and twenty-five in circumference: they appear at the base of the leaves on very short stalks, the great heads (*Cabeza de Negro*, like Negroes' heads, whence that name) resting on the ground, or lodged among the axils of the foliage, constituting a dry Drupe; that is, the covering to the seeds in an early stage is soft, fluid, or pulpy, but eventually dries up into a

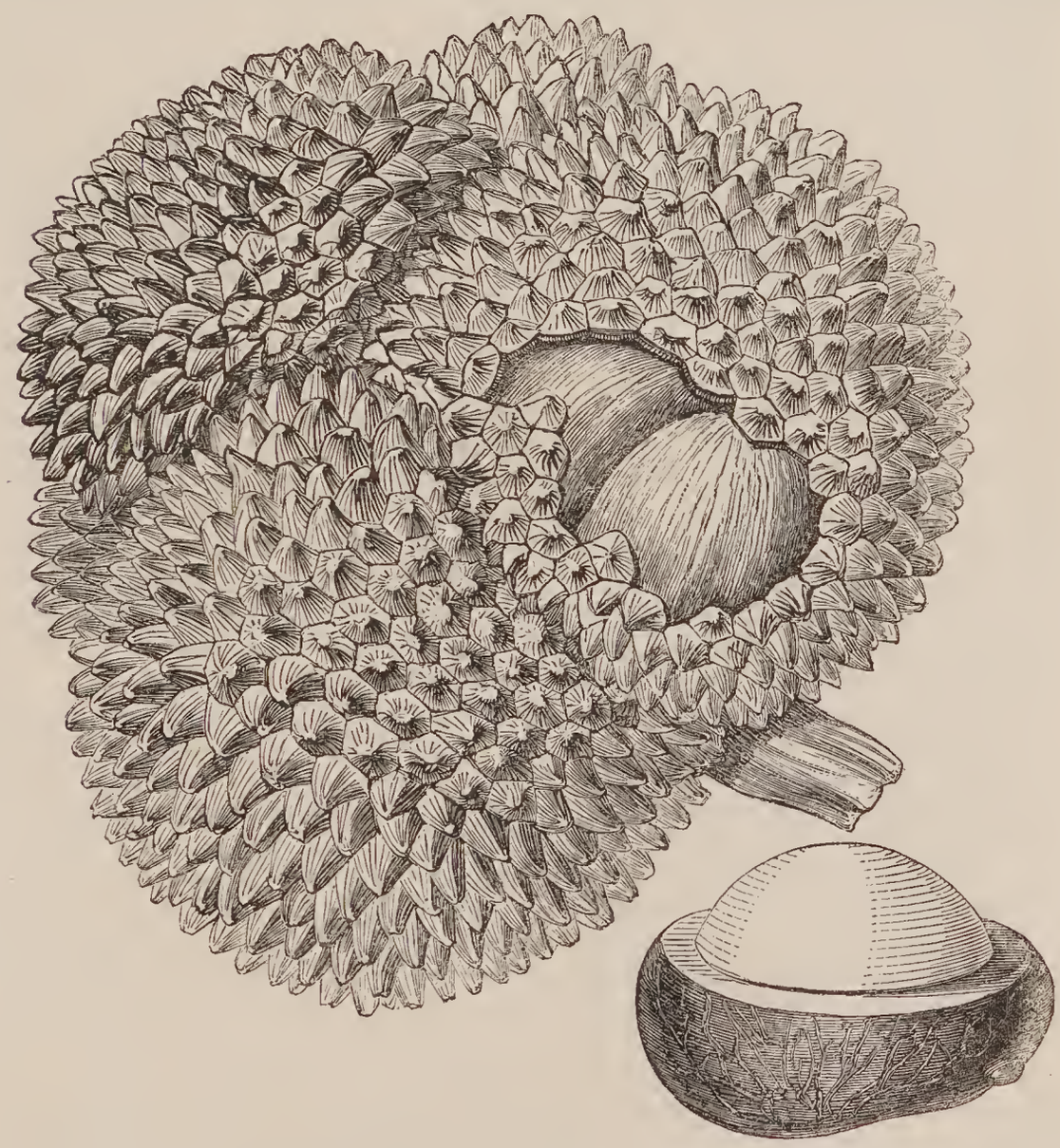

FIG. 2. FIG. 3.

Fruit and Seed of Phytelephas macrocarpa.

(The seed is represented as partially turned in a lathe to show a convex ivory-like surface of the albumen).

hard, almost woody mass, 3—4 or 5-lobed, and everywhere embossed with conical, angular tubercles, something like the coat of a pine-apple. These tubercles, however, vary remarkably in size and length, giving an impression that there are several species of the genus. Within each lobe are several (the number would appear very uncertain) large, hard, smooth, oval or obovate, or almost spherical seeds, of a greyish-brown colour, sometimes with the sides flattened by pressure, sometimes depressed. In this state they are sent to Europe, for it is they which contain the ivory-like substance. The outer coat, hard and crustaceous, is easily removed, when a thin brown skin appears, marked with anastomosing vessels, and distinguished by a hole or foramen, indicating the position of the embryo. Within this skin, the whole is occupied from the centre to the circumference with the exception of the small embryo, by the albumen, the food of the young plant, analogous to the white of an egg ; and the albumen (which, in the cocoa-nut is soft and fleshy and eatable), is here firm and hard, in appearance exactly resembling ivory, hence employed by the mechanics as far as the size will allow, for various purposes in turning, &c., as a substitute for ivory, a much more expensive article. What is wanting in size, however, is often made up by the skill and ingenuity of the workman : when an article is turned it easily permits of pieces being added and united to it without the blemish being exposed to view; and where a lid is required for a box of vegetable ivory, a separate seed is used for the lid.

Thus we have another among many instances, of a vegetable product so nearly resembling, and exactly resembling to the eye, an animal substance (and that of a very distinct yet familiar character) as to be frequently passed off for such ; and the generic name *Phytelephas* (Ruiz and Pavon) will thus be found to be very appropriate, being derived from φυτον, a *plant*, and ελεφας, an *elephant*, for as the elephant is the ivory-bearing animal, so the *Tagua* is the ivory-bearing plant. Much, however, as the albumen of the seed of the *Phytelephas* resembles animal ivory at the first glance, its internal organization is extremely different, as may be expected. That of the seed of Palms, generally, has been admirably illustrated with figures and descriptions by Hugo Mohl; but that of the plant under consideration has especially occupied the attention of Professor Morren, of Brussels, in the second part of the first volume of *Dodonœa, ou Recueil d'Observations de Botanique*, p. 74, from which we give the following extract, and we must refer to the plate itself of that work (Tab. II.) for the highly magnified appearance of this beautiful and curious structure, and to the several figures to which reference is frequently made :—

" The external covering of the ivory-nut (seed) is so hard as to be almost stony, yellowish-grey, smooth, and destitute of gloss; it is attached to a second coating, which is brown, porous, and dull, and is incorporated with it. Beneath a hollow, which separates these two integuments, is a third, brown, veined, warted and glossy covering, traversed by numerous fibres, under which lies the albumen which forms the vegetable ivory. The vegetable ivory is of the purest white, and free from veins, dots, or vessels of any kind, presenting a perfect uniformity of texture, surpassing the finest animal ivory ; and its substance is everywhere so hard, that the slightest streaks from the turning-lathe are observable, and cannot be erased till it is newly fashioned.

" When the article is carved, the vegetable ivory may be known by its brightness, and by its fatty appearance, whereon the well-skilled may discern the minute lines which are the beds of cells. Its structure would almost seem to show more analogy with bone than with ivory ; but a microscopic investigation quickly proves that vegetable ivory possesses an entirely different structure.

" This structure is among the most curious in the vegetable kingdom.

"The external covering of the albumen is composed, as we proceed from the outside to the inside, of

"I. A layer of ovoid cellules, with brown thick parietes, the elongated centre of each cellule is filled with a darker substance.

"II. A second layer of ovoid cells, placed perpendicularly on the first, but with the innermost elongated, and approximating towards the structure of the next layer.

"III. A third layer of cells, still more elongated and fusiform, their parieties are thick and brown.

"IV. A fourth layer of smaller and prismatic cells, placed perpendicularly and regularly over the preceding layer : they rest in their turn upon the last, which is,

"V. A final layer of very dark and irregular cells, externally coated, on the side towards the albumen, with a brown colouring matter, which imparts its hue to the surface of the albumen, or vegetable ivory."

All the above-described organization belongs only to the integumentary system.

"The albumen, or vegetable ivory itself, is composed of concentric layers, of which only the most external differ from the most internal. When the albumen is hard, as was that which I examined, it presents a white substance, transparent in water, and which appears continuous, and not to be distinguished into various degrees of growth. It is perforated with an infinity of holes, the sections of so many cavities; the latter are irregularly rounded and also prolonged into arms or tubes, which give a starry appearance to the cavities, many of them being 5, 6, 7, 8, and 10 rayed. Here and there may be seen a little spheroidal cavity ; finally, the tubes appear to be each tipped with a small swollen head.

"Throughout the albumen the above-described structure is more or less regular, offering a beautiful study to the vegetable anatomist.

"Generally speaking, the starry cavities are arranged in a quincunx, so that the interval between two of them corresponds to a third. A little attention also enables the observer to see that those rays, which are terminated by a little head, answer always to one another. The space between these heads is largest in a dry slice and least in a moist one. The central cavity is sometimes empty, and sometimes filled with a substance composed of very minute globules, reaching occasionally to the very tips of the rays.

"It is evident that these starry cavities represent so many hollows of cells, which still preserve their radii of communication, though the primitive parieties are obliterated ; and in some instances, the cavities only remain in the form of ovoidal cells, which still can be restored to their original configuration by immersing the portion of albumen in Canada balsam. I have dried a carefully cut slice of the ivory, and then subjected it to the influence of Canada balsam, which rendered it so perfectly diaphanous as to be scarcely discernible by the naked eye from the balsam. This process has the effect of restoring the cells to their normal structure ; they become 6-rayed, the tubes correspond exactly with each other, and every one is tipped with a swollen head, and more or less filled with the globular substance of which I have spoken. Thus we see revealed the whole organization of vegetable ivory, which is merely a prismenchyme with thickened cells, in which the rays of communication are preserved. The closest scrutiny has not enabled me to detect in the thick portion of the cells the smallest trace of those layers of growth which have been detected by M. Valentin, especially in the *Hoya carnosa* and *Oreodoxa regia*, &c.

"This substance, which appears continuous, is very analogous to that which MM. Schleiden and Theodore Vogel, in their researches into the nature of the albumen, have found in the albumen of *Phœnix dactylifera* ; only that in the latter, there is no starry disposition of the tubes, and the

hollows of the cells are elongated into two, or, at most, into three radii of communication."

M. Morren has well observed, at p. 72, "l'ivoire qu'on retire de ces graines n'est autre chose que l'albumen qui, de laiteux qu'il était d'abord, d'albumineux qu'il était ensuite, a fini par acquérir la consistence du blanc d'amande pour passer enfin à l'état dur, élastique et blanc qui l'a fait comparer à l'ivoire."

It is a no less curious fact that this hard eburneous mass again reverts to its former soft state in the process of germination. This we have frequently had the opportunity of witnessing; our seeds were mostly sown in pots, one in each pot, and buried two inches or more under the earth. The first symptom of vitality is apparent by the protrusion of a strong stout fibre, which quickly takes a downward direction, and elongating some inches, produces from the opposite extremity a new *plant* which soon developes itself in the air, while from its base the true roots descend. Gradually the *seed* so recently buried emerges to the surface, there lying on the earth; or more frequently, it is forced out of the pot, hanging over the edge and suspended by the strong fibre before alluded to, which thus forms a medium of communication by its vessels between the seed and the very base of the young plants (the collum), or point of junction of the root and stem. If at this time the seed be broken, the inside will be found to have become a soft substance, half pulp and half milk, which feeds the young plant, till it is old enough to derive its nutriment wholly from the soil, viz., when the plant is a year or more old. If the seed be then tapped with a hard instrument, its sound will indicate its emptiness; and the fracture of the shell will exhibit nothing in the interior but a little half-dried pulp, lining the inner integument of the seed. Henceforth the plant depends upon the soil for its nourishment and growth; and our individuals, now four years old, exhibit very much of the perfect character of the palm, save in size (for the oldest has no real stem), the leaves with us being four feet long instead of twenty, as in the fully developed specimens.

REFERENCES TO THE CUTS.

Fig. 1. A scene upon a river-bank, exhibiting a *Phytelephas macrocarpa* very much reduced.

Fig. 2. A fully formed fruit, with the coat partially broken to show some of the seeds within; about one-quarter of the natural size. Fig. 3, seed, which has been partially turned in a lathe to show a convex ivory-like surface of the albumen. The seeds are frequently sold in the shops in this state.—*Hooker's Journal of Botany.*

ON THE MOMENTARY INCOMBUSTIBILITY OF LIVING ORGANIC TISSUES,

AND ON THE PHYSICAL CONSTITUTION OF BODIES IN THE SPHEROIDAL STATE.

BY M. BOUTIGNY.

Doubts have been expressed by some persons as to the reality of the facts which I have described with reference to the momentary incombustibility of organic tissues, and the theory I have proposed for the explanation of these effects, which appear so extraordinary, especially to those who see them or hear them described for the first time.

This feeling of incredulity is contagious, as would appear from the fact that I have doubted myself, and have been ready to question whether I had not been the victim of some illusion, which I had subsequently induced the public to accept as reality.

Under such circumstances the course to be pursued is evident. It is to repeat the experiments, to multiply and vary them, and especially to

simplify them, so as to make them accessible to all. This is the course that I have pursued.

I placed a few drops of distilled water on the surface of melted lead, when it assumed the spheroidal state ; alcohol and ether, under like circumstances, also presented similar phenomena.

Encouraged by these results I no longer hesitated to repeat the experiment in the following way:—

I wetted my fore-finger with water and then plunged it into the melted lead, and experienced no greater sensation of heat than that afforded by water in the spheroidal state.

The experiment was repeated, substituting alcohol for water, and although there was still a sensation of heat, yet it was by no means insupportable.

Lastly, I wetted the finger with ether, and this time there was no sensation of heat; but, on the other hand, an agreeable sensation of coolness.

I repeated the experiment a great number of times, and do not hesitate to declare that it is perfectly free from danger, and that the whitest and most delicate hand of a lady might be thus applied without the slightest danger, and, moreover, without inconvenience.

Nevertheless, I ought to remark that the results of the experiment are liable to variation according to the conditions under which it is performed. Thus, for example, if, after having dipped the finger into ether, it be not immediately plunged into the fused metal, a sensation of heat will be felt as would have been the case without the previous immersion in ether, and this occurs in consequence of the very volatile nature of the liquid.*

Great care should be taken not to immerse the finger into the metal when it is near the point of solidification, for it might happen that the finger became fixed, or that a portion of the metal remained attached to it, thus producing a dangerous burn ; and I speak from experience of the possibility of these results, having frequently suffered from them.

Alcohol and ether, which are so well adapted for the experiment with fused lead, would be quite inapplicable for those with cast-iron, the temperature of which, as I have previously stated, would be sufficient to ignite them.

I ought here to notice a remarkable fact, and one confirming the theory which I have given in a previous memoir,† which is, that those parts of the hand which are not immersed in the fused metal, and which are exposed to the action of the heat radiated from the surface of the metal, experience a painful degree of heat, followed by a redness of the skin, whilst, on the contrary, those parts which are immersed remain safe and sound.

I now quit this subject, having, as far as I am concerned, disposed of it, and proceed to notice another class of facts, of very different value, in my opinion, in a purely scientific point of view. I speak of the physical constitution of the surface of any body in a spheroidal state.

In a treatise which I had the honour of addressing to the Academy, I have described an experiment which consists in bringing solution of ammonia into the spheroidal state, and then adding a little iodine, which mixes and finally dissolves; but during the re-action, if the mixture is examined with attention, it will be observed that there are a number of

* A mixture of ten parts of alcohol and twenty parts of ether, in which one part of soap has been dissolved, answers well for these experiments.

† Perhaps the vital force plays an important part in these phenomena of incombustibility. I have noticed, in my preceding memoir, that the temperature of an animal is (within certain limits) invariable, whatever variations there may be in the surrounding medium; but this condition of stable equilibrium is precisely that which best characterizes bodies in the spheroidal state; there may, therefore, be some relation between the vital force and the phenomena of the spheroidal state.

currents circulating in all directions with a rapidity which the eye can hardly follow. It appeared to me that the film which limited the spheroid did not participate at all in the movements occurring in the strata beneath. Other experiments had confirmed this observation, and left no doubt in my mind on this point; but this was not enough, for I must be in a condition to convince others, and especially those who do not think it absolutely necessary to have passed the ordeal of the schools, or to belong to privileged bodies, in order to read the great book of nature, and discover one of the thousand truths which she holds in reserve for those who seriously take the trouble to investigate.

I hope to be able to establish the following proposition from experiment, viz.:—*That bodies in the spheroidal state are limited by a layer of matter, the molecules of which are united in such a manner that it may be compared to a solid envelope, transparent, infinitely thin, and very elastic.*

Take five centigrammes (.75 grains) of red coal in powder, each particle of which is not more than a quarter of a millemetre (.0098 inch) in its greatest diameter, and mix it with ten grammes (154 grains) of distilled water; then project a few drops of the mixture, by means of a pipette, into a brightly polished platinum crucible, heated to redness, and closely observe what occurs. Currents, such as I have already described, will be perfectly apparent, yet the external layer of the spheroid will not at all participate in them. Sometimes the little particles of coal will be carried into the external layer and become fixed there, in which case they become points for comparison with other moveable parts. When sufficient patience is exercised in watching these effects, no doubt can rest on the mind, the currents being found to circulate in the interior of the spheroid, while the external layer remains perfectly free from them. The effect may be rendered more lasting by adding, from time to time, a little more distilled water, so as to maintain the size of the spheroid.

On adding a little lime-water to the mixture of coal and water, the phenomenon is much more marked; but in this case it may be objected that it is a film of carbonate of lime which limits the spheroid, for, in fact, all the lime passes in the state of carbonate to the surface of the spheroid.

Thus, as I have already stated, bodies in the spheroidal state are bounded by a layer, the cohesion of which is such that it may be considered to be solid, or in a peculiar molecular state similar to that of solids, so that it may be said to be isolated from the rest of the mass.

This circumstance may probably serve to explain certain properties of bodies in the spheroidal state, especially the slowness with which they undergo evaporation, for it is known that water, for instance, evaporates five times more rapidly under the ordinary conditions of ebullition than it does when placed in a vessel heated to 400° Fahr. May not the same circumstance serve to account for the permanence even of sulphurous acid and nitrous oxide in the spheroidal state, when exposed in red-hot capsules, and in vacuo? Future investigations will no doubt prove it to be so.*

The opinion which I have thus briefly stated with reference to the physical constitution of bodies in the spheroidal state, although based on experience and observation, will certainly not be admitted without contention. It appears too paradoxical for it to be otherwise.†

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* The permanence of liquified gases in the spheroidal state, *in vacuo* and in red-hot capsules, that is to say, under the conditions in which they would be expected either to volatilize immediately or to explode, has escaped notice in France, but it is worthy the attention of scientific men.

† Count Rumford, about forty years ago, expressed a similar opinion. Whether hypothetically or from experience, I am unable to say, not having been able to procure the work in which it is mentioned.

For instance, it may be objected that the solid layer which bounds the spheroid should be less dense than the liquid portion, otherwise it would be precipitated towards the centre of the sphere by the force of attraction; but, as it may be added, this is contrary to physical laws, a solid being always more dense than the liquid producing it.

To this I answer that this law is not so general as is believed, as will be seen from the following exceptions. The first is well known. 1st. Solid water is less dense than liquid water ; 2nd. Many metals are less dense than mercury ; 3rd. Solid silver floats on the same metal in fusion; 4th. The specific gravity of melted lead is greater than that of the same metal in the solid state, &c. &c.

This objection, therefore, is of no importance. If there are others, I will either admit or reject them according to their merits, and then time and the public will pronounce the final judgment.—*Journal de Pharmacie.*

ON THE DIFFUSION OF LIQUIDS.

BY PROFESSOR GRAHAM.

(*Abstract of the Bakerian Lecture, delivered before the Royal Society, 21st December*, 1849.)

The Lecturer commenced by observing, that a salt or other soluble substance once liquified and in a state of solution, is evidently spread or diffused uniformly through the mass of the solvent, by a spontaneous process. It has often been asked whether this process is of the nature of the diffusion of gases, but no satisfactory answer to the question appears to be obtained, owing, he believed, to the subject having been studied chiefly in the operations of endosmosis, where the action of diffusion is complicated and obscured by the imbibing power of the membrane, which appears to be peculiar for each soluble substance, but not necessarily connected with the diffusibility of the substance in water. Gay Lussac proceeded upon the assumed analogy of gaseous and liquid diffusion in the remarkable explanation which he suggested of the cold produced on diluting certain saline solutions, namely, that the molecules of the salt expand into the water like a compressed gas admitted into additional space. The phenomena of solubility were at the same time considered by that acute philosopher as radically different from those of chemical affinity, and as the result of an attraction which is of a physical or mechanical kind. The characters indeed of these two attractions are strongly contrasted. Chemical combination is uniformly attended with the evolution of heat, while solution is marked with equal constancy by the production of cold. The substances which combine chemically are the dissimilar, while the soluble substance and its solvent are the like or analogous in composition and properties.

It was further premised, that two views may be taken of the physical agency by which gaseous diffusion itself is effected, which are equally tenable, being both entirely sufficient to explain the phenomena. On one theory, that of Dr. Dalton, the diffusibility of a gas is referred immediately to its elasticity. The same spring or self repulsion of its particles, which sends a gas into a vacuum, is supposed to propel it through and among the particles of a different gas. In the other theory, the existence of an attraction of the particles of one gas for the particles of all other gases is assumed. This attraction does not occasion any diminution of volume of gases on mixing, because it is an attraction residing on the surfaces of the gaseous molecules. It is of the same intensity for all gases ; hence its effect in bringing about intermixture is dependent upon the weight of the molecules of the gases to be moved by it, and the velocity of diffusion of a

gas comes to have the same relation to its density on this hypothesis as upon the other. The surface attraction of molecules assumed, will recall the surface attraction of liquids, which is found necessary to account for the elevation of liquids in tubes, and other phenomena of capillary attraction.

The apparatus used in studying the diffusion of salts and other substances into water was very simple. It consisted of an open phial, to contain the solution of the salt to be diffused, which was entirely immersed in a large jar of pure water, so that the solution in the phial communicated freely with the latter. Phials cast in a mould of the capacity of four ounces of water, or more nearly 2,000 grains, were generally employed, which were ground down to an uniform height of 3.8 inches. The neck was 0.5 inch in depth, and the aperture or mouth of the phial 1.25 inch in diameter. The phial was filled up with the solution to be diffused till it reached the point of a pin, dipping exactly 0.5 inch into the mouth of the bottle. This being the solution cell or bottle, and the external jar the "water jar," the pair together form a "diffusion cell." The diffusion was stopped generally after seven or eight days, by closing the mouth of the phial with a plate of glass, and then raising it out of the water jar. The quantity of salt which had found its way into the water jar—the diffusion product as it was called—was then determined by evaporating to dryness.

The characters of liquid diffusion were first examined in detail with reference to common salt.

It was found, first, that with solutions containing 1, 2, 3, and 4 per cent. of salt, the quantities which diffused out of the phials into the water of the jars, and were obtained by evaporating the latter, in a constant period of eight days, were as nearly in proportion to these numbers, as 1, 1.99, 3.01, and 4.00; and that in repetitions of the experiments, the results did not vary more than 1-40th part. The proportion of salt which diffused out in such experiments amounted to about 1-8th of the whole.

Secondly, that the proportion of salt diffused increases with the temperature; an elevation of 80° Fahr. doubling the quantity of chloride of sodium diffused in the same time.

The diffusibility of a variety of substances was next compared, a solution of 20 parts of the substance in 100 water being always used. Some of the results were as follows, the quantities diffused being expressed in grains:—Chloride of sodium 58.68, sulphate of magnesia 27.42, sulphate of water 69.32, crystallised cane sugar 26.74, starch sugar 26.94, gum arabic 13.24, albumen 3.03. The low diffusibility of albumen is very remarkable, and the value of this property in retaining the serous fluids within the blood-vessels at once suggests itself. It was further observed, that common salt, sugar, and urea, added to the albumen under diffusion, diffused away from the latter as readily as from their aqueous solutions, leaving the albumen behind in the phial. Urea itself is as highly diffusible as chloride of sodium.

In comparing the diffusion of salts dissolved in ten times their weight of water, it was found that isomorphous compounds generally had an equal diffusibility, chloride of potassium corresponding with chloride of ammonium, nitrate of potash with nitrate of ammonia, and sulphate of magnesia with sulphate of zinc. The most remarkable circumstance is, that these pairs are "equi-diffusive," not for chemically equivalent quantities, but for equal weights simply. The acids differed greatly in diffusibility, nitric acid being nearly four times more diffusive than phosphoric acid; but these substances also fell into groups, nitric and hydrochloric acids appearing to be equally diffusive; so also acetic and sulphuric acids. Soluble subsalts and the ammoniated salts of the metals present a surprisingly low diffusibility. The quantities diffused in similar circumstances of the

three salts, sulphate of ammonia, sulphate of copper, and the blue ammonia sulphate of copper being very nearly as 8, 4, and 1.

When two salts are mixed in the solution cell, they diffuse out into the water atmosphere separately and independently of each other, according to their individual diffusibilities. This is quite analogous to what happens when mixed gases are diffused into air. An important consequence is, that in liquid diffusion we have a new method of separation or analysis for many soluble bodies, quite analogous in principle to the separation of unequally volatile substances in the process of distillation. Thus, it was shown that chlorides diffuse out from sulphates and carbonates, and salts of potash from salts of soda; and that from sea-water the salts of soda diffuse out into pure water faster than the salts of magnesia. The latter circumstance was applied to explain the discordant results which have been obtained by different chemists in the analysis of the water of the Dead Sea, taken near the surface; the different salts diffusing up, with unequal velocity, into the sheet of fresh water, with which the lake is periodically covered during the wet season.

It was further shown that chemical decompositions may be produced by liquid diffusion. The constituents of a double salt of so much stability as common alum being separated; and the sulphate of potash diffusing in the largest proportion. In fact, the diffusive force is one of great energy, and quite as capable of breaking up compounds as the unequal volatility of their constituents. Many empirical operations in the chemical arts, it was said, have their foundation in such decompositions.

Again, one salt, such as nitrate of potash, will diffuse into a solution of another salt, such as nitrate of ammonia, as rapidly as into pure water; the salts appearing mutually diffusible, as gases are known to be.

Lastly, the diffusibilities of the salts into water, like those of the gases into air, appear to be connected by simple numerical relations. These relations are best observed when dilute solutions of the salts are diffused from the solution cell, such as 4, 2, or even 1 per cent. of salt. The quantities diffused in the same period of seven days from 4 per cent. solutions of the three salts, carbonate of potash, sulphate of potash, and sulphate of ammonia, were 10.25 grains, 10.57 and 10.51 grains respectively; and a similar approach to equality was observed in the 2, 4, and 6 per cent. solutions of the same salts. It also held at different temperatures. The acetate of potash appeared to coincide in diffusibility with the same group, and so did the ferrocyanide of potassium. The nitrate of potash, chlorate of potash, nitrate of ammonia, chloride of potassium, and chloride of ammonium, formed another equi-diffusive group. The times in which an equal amount of diffusion took place in these two groups, appeared to be as 1 for the second to 1.4142 for the first, or as 1 to the square root of 2. Now, in gases, the *squares of the times* of equal diffusion are the *densities of the gases*. The relation between the sulphate of potash and nitrate of potash groups would therefore fall to be referred to the diffusion molecule and diffusion vapour of the first group having a density represented by 2, while that of the second group is represented by 1. These were named the *solution densities* of the salts in question. The corresponding salts of soda appeared to fall into a nitrate and sulphate group also, which have the same relation to each other as the potash salts. The relation of the salts of potash to those of soda in times of equal diffusibility appeared to be as the square root of 2 to the square root of 3; which gives to them solution densities of 2 and 3. Hydrate of potash and sulphate of magnesia were less fully examined; but the first presented sensibly double the diffusibility of sulphate of potash, and four times the diffusibility of the sulphate of magnesia. If these times are all squared, the following remarkable ratios are obtained for the solution densities of these different salts, each of which is the type of a class of salts: hydrate of potash 1, nitrate of

potash 2, sulphate of potash 4, sulphate of magnesia 16, with nitrate of soda 3, and sulphate of soda 6. In conclusion, it was observed that it is the diffusion molecules of the salts, having such densities, which are concerned insolubility, and not the Daltonian atoms or equivalents of chemical combination ; and the application was indicated of a knowledge of the diffusibilities of different substances to the study of endosmose, in which the proper function of the membrane would be distinguished from that of the salt.

THE WATERS OF THE METROPOLIS.

In reference to the supply of water to our metropolis, alluded to in another part of this number, several questions present themselves which require for their solution a certain amount of chemical knowledge and experience. The subject is undoubtedly one of great importance, seeing that water is an essential constituent of our food, and a necessary agent in most sanitary operations. But the questions at issue cannot be satisfactorily settled without an appeal to statistics, and to the results of careful chemical investigations.

We have to consider, in the first place, what constitutes a *good water* for alimentary and other domestic uses? We shall subsequently have to inquire, How far the waters now supplied to the inhabitants of London fulfil the conditions required? and if they should be found defective, what means are best adapted for improving the supply?

In the discussion of this subject, the term *pure water* is frequently employed to designate the highest standard of quality ; but this term can only be applied in a restricted sense, and not to indicate absolute purity. Chemically pure water, if it could be obtained, would not, probably, be so well suited to our wants as that which is more abundantly supplied in nature. It would appear, from observations made by Boussingault, Dupasquier, and others (see vol. vi., page 280, of this Journal), that those waters which are most free from mineral substances in solution, are not, on this account, the most wholesome. Dupasquier says, "Absolutely pure water—distilled water which contains no salt—is not agreeable to drink: its taste is insipid; and experience proves that it is heavy on the stomach, and tends to indigestion. It is, therefore, a wise provision of Nature, that waters contain a greater or less quantity of foreign substances in solution. Their quality, as potable waters, does not depend on their purity." Distilled water, it is true, has been recommended for dietetical purposes in preference to common water, by Dr. Lambe, and some other medical men ; but experienee does not appear to have justified the preference, and its use for such purposes is now almost unknown.

But, even had we the means of obtaining pure water, and could it be shown that advantage would result from its employment, we should not be able, with the arrangements at present adopted for its distribution and use, to prevent its acquiring a much more dangerous contamination than any to which the present supply is subject. Pure water, in the presence of atmospheric air, acts upon lead, of which a great part of the water-pipes and cisterns are made, and a portion of this poisonous metal, in combination with oxygen and carbonic acid, becomes dissolved in the water, so as to render it highly deleterious.

The water supplied for general use, then, should contain certain substances in solution, which render it more agreeable, and probably

more wholesome in its dietetical applications, and at the same time prevent its becoming contaminated by contact with leaden pipes and cisterns; and it is important to determine, as far as we are able, what substances will fulfil these objects, without interfering with the use of the water for other purposes for which it is required.

The substances held in solution in natural waters may be divided into two classes,—organic substances, and inorganic substances. Of these, it is universally admitted that the organic substances frequently render the waters disagreeable and unwholesome, that their presence sometimes renders it unfit for certain applications in the arts, and that, in no case, do they contribute to any useful purpose in the applications here contemplated. It may be safely asserted then, that the more free a water is from organic substances, the better will it be adapted, in this respect, for alimentary and other domestic uses.

We must seek among inorganic substances for those, the presence of which is beneficial. There is probably no one of this class of the constituents of natural waters obtained from wells or rivers that is so generally distributed as bicarbonate of lime. This salt gives an agreeable flavour to water, and is considered by many to render it wholesome, if it be not present in too great a quantity. Sulphate of lime and chloride of calcium are frequently found associated with the bicarbonate of lime, and these, when present only in small quantity, appear not to be injurious. Among other inorganic substances found, are, salts of magnesia in small quantities, and sulphate and muriate of soda, or more rarely of potash. A water containing from eight to ten grains of bicarbonate of lime, together with three or four grains of sulphate of lime, magnesia, or soda, in the imperial gallon, would probably fulfil all the conditions required for a good and wholesome water. Such a water would not be subject to contamination with lead, for it has been found that carbonates and sulphates when present to about the extent above-mentioned, prevent the lead from becoming corroded and dissolved by the water.

The objects above stated being fulfilled, there will be no advantage in having more saline matter present than is necessary for that purpose. On the other hand, the salts of lime and magnesia tend to give the water the character of hardness, which detracts from its value in some of its domestic applications.

That water, therefore, will be best suited for alimentary and other domestic uses which is most free from organic matter, and which, while it contains enough saline matter to render it agreeable, wholesome, and secure from metallic impregnation, is not overcharged with those salts which give it the character of hardness.

The following article, by Professor Brande, contains some practical information on the subject, which we intend to resume next month.

ANALYSIS OF THE WELL-WATER AT THE ROYAL MINT,

With some Remarks on the Waters of the London Wells.

BY WILLIAM THOMAS BRANDE, ESQ., F.R.S., V.P.C.S., &c., &c.

Previous to the year 1842, the Mint was supplied with water principally from two sources—the dwelling-houses, offices, and a part of the works, by the New River Company; and the steam engines, by wells

partly supplied by so-called land-springs, and partly by a tunnel communicating with the Tower Moat; the principal supplies being derived from the latter; so that when in consequence of any works carrying on at the Tower, the access of the river to the moat was impeded, the operations of the Mint were not unfrequently obliged to be suspended; besides which, the water derived from that source was always muddy, and often very foul and offensive.

In consequeuce of this bad condition of the water in the Tower Moat, and the effluvia arising from it in hot weather, it was resolved in the year 1843, to drain and lay it dry. The Mint was accordingly altogether deprived of its supply of water from that source, and the land-springs supplying the wells of the several steam engines, to say nothing of the impurity and hardness of the water thence derived, were found wholly inadequate to the wants of the engines. It, therefore, became necessary to have recourse to the New River Company for such additional supplies of water as might be wanted for carryiug on the business of the Mint: and for this, their charges, as far as the steam engines were concerned, were at the rate of £10 per horse power per annum: but, from various causes, these supplies could not always be depended upon, so that on several occasions a temporary suspension of the business of the Mint was the consequence of a deficient supply of water.

Under these circumstances it became my duty to suggest to the Master of the Mint the adoption of such measures as might ensure for the future a regular and adequate supply of water for the use of the whole establishment; and to this end, it was necessary, in the first instance, to make myself accurately acquainted with the actual condition of the several wells existing in the Mint, and with the quantity and quality of the water which might be derived from them. I was, therefore, authorised by the Master of the Mint to consult with Mr. Thomas Clark, an experienced well engineer, in reference to the subject; and I accordingly desired him to examine into the condition and capabilities of all the wells, shafts, and tunnels connected with the supplies of water throughout the building. This examination was carefully and effectually accomplished; and it appeared that the several wells were in a very dilapidated, and some of them in a very dangerous state; that few of them were so situated or conditioned, as to admit of being sufficiently or safely deepened, so as to yield an adequate supply of water; and that, as respected the wells in the several engine-houses, they were mere reservoirs connected with the tunnel-shaft from the Tower, and, therefore, almost exclusively supplied from the muddy source of the Tower Moat.

Having personally convinced myself of the correctness of this Report, and having had Mr. Clark's statement corroborated by Mr. George Rennie, I represented the matter in detail to the Master of the Mint, and suggested three plans for consideration, namely: 1. To derive the requisite supplies of water from the water companies. 2. To repair the present wells, and to deepen such of them as would admit of that operation. 3. To sink an entirely new well: and I strongly urged the adoption of the latter alternative, which, after due consideration, was agreed to. I therefore obtained proper plans and estimates from Mr. Clark, which, after having been submitted to the Board of Works, and, by their direction, to Major Jebb, were ultimately ordered to be carried into execution.

These plans included the sinking of an entirely new well; the erection of a capacious water-tank, at a sufficient height to supply the ordinary demands of the Mint; proper pumps for raising the water, and mains for distributing it over all parts of the buildings; together with fire-cocks, and other arrangements, the details of which would be irrelevant to the object of this communication.

It may be right to premise, that the total depth of this new well is about

426 feet; that the depth from the surface down to the chalk is about 224 feet; and the borings into the chalk about 202 feet; the following being the well-sinker's account of the strata gone through; namely:

	Feet.
Made earth	11
Gravel and sand (with water)	13
Blue clay with a few sandy veins (no water)	98
Coloured sand and pebbles (abundance of water)	14
Dark sand with veins of clay (little water)	4
Mottled clay (dry)	6
Loamy sand and dark clay (little water)	5
Blue clay with shells	6
White rock (quite dry)	3
Green sandy rock and pebbles (dry)	3
Loamy green sand and black pebbles (little water)	5
Green sand and pebbles (abundance of water)	6
Dark sand with shells	40
Flints	10
Chalk	202
	426

The lining of the upper part of the well, through the gravel, and into the blue clay, is composed of stout cast-iron cylinders, $1\frac{1}{4}$ inch thick, and 8 feet clear diameter; they are made in 5 feet lengths, with internal flanges 3 inches wide, packed, and jointed with strong bolts and nuts: these prevent all access of the land-springs from above. The shaft is then steined to the depth of 88 feet (that is, nearly through the blue clay), in 9-inch cemented brickwork; after which, cast-iron cylinders are resumed, of 7 feet diameter, and these are continued down to the chalk; but after passing through the stratum of mottled clay, they include a series of cylinders of 6 feet diameter, the space between the outer and inner cylinders being filled with gravel-pebbles; a bore-pipe, 20 inches diameter and 45 feet long, is then driven to about 10 feet into the chalk, and through this the boring is continued, by an 18-inch auger, to the entire depth of the well.

This well, and all the works connected with it, were completed at Christmas 1846, and on the 1st of January 1847, the whole of the works of the Mint, and the dwelling-houses, were supplied with the water, which is raised in a 6-inch main to a height of 50 feet above the surface, or 130 feet above the average level of the water in the well; and is delivered at the rate of 240 gallons per minute, by means of three pumps of 9-inch diameter and 8-inch stroke, into a tank supported upon a building of brickwork. This tank is 100 feet long, 30 wide, and 5 deep; it contains, therefore, 15,000 cubic feet of water, or 93,750 imperial gallons. Two 6-inch cast-iron mains, furnished with proper slide valves, descend from this tank, one passing on either side of the Mint, so as conveniently to supply the whole of the establishment: the daily consumption of water frequently exceeding 40,000 gallons; besides which, a daily supply of about 6,000 gallons is delivered, by means of a main laid from the Mint across Tower Hill to the Tower, for the use of the inhabitants and the garrison; there being at present no serviceable wells in that fortress, and the water derived from the adjacent river being objectionable in point of cleanliness.

The average height which the water attains in the shaft of the Mint well is 80 feet from the surface. After a day's pumping it is lowered, upon an average, 20 feet, but there it remains stationary, the flow of water from below maintaining the level, or, in other words, delivering at the rate of about 240 gallons per minute.

Before this well was completed, and before the boring into the chalk had been accomplished, the water derived from it contained 44 grains of

dry saline matter in the imperial gallon. At present, the machinery being complete, and the well in full and daily use, the mean of several experiments in reference to the solid matter contained in the imperial gallon of the water, amounts to 37.5 grains.

The substances contained in each gallon of the water are as follow:

Sulphuric acid	7.44
Chlorine	6.31
Carbonic acid (after boiling)	5.84
Silica	0.50
Sodium (combined with chlorine)	4.22
Soda (combined with sulphuric and carbonic acids)	10.82
Lime	1.96
Magnesia	0.71
Organic matter, Phosphoric acid, Iron	traces.

The water evaporated to one-fifth of its bulk, and filtered, had lost almost every trace of lime and of magnesia, so that it is probable that the greater part of those substances were held in the state of *carbonates*, by excess of carbonic acid. The carbonate of lime forms films during boiling, which subside, and appear under the microscope in the form of very minute acicular crystals. The crystalline deposit obtained by slowly evaporating the water after the precipitated carbonate of lime has been separated by filtration, exhibits, under the microscope, three distinct forms; namely, (cubes of chloride of sodium); prisms, which lie distinct upon the other salts, and are efflorescent (sulphate of soda); and small aggregates of rhomboids intermixed with small spherical particles, like pin-heads (carbonate of soda). The residue of the evaporation of the water, after having been gradually raised to a dull red heat, acquired a grey tint, and exhaled a slight odour of burning azotised matter; and a piece of moistened turmeric paper held in the evolved vapour was transitorily reddened.

I have not been able to detect any potassa in this water; and only a slight indication of the presence of a phosphate, in the precipitate deposited by the water during boiling.

Upon the whole, I am inclined to regard the following as a tolerably correct statement of the proximate saline components of this water:

	Grains in the imperial gallon.
Chloride of sodium	10.53
Sulphate of soda	13.14
Carbonate of soda	8.63
Carbonate of lime	3.50
Carbonate of magnesia	1.50
Silica	0.50
Organic matter, Iron, Phosphoric acid	traces.
	37.80

The specific gravity of the water at 55° is 10007. Its gaseous contents, I have not ascertained.

A section of the well accompanies this paper, which will shew such details of its construction as I have not thought it necessary to enter into, as well as the relative thickness and position of the intersected strata.

I have examined the water of several other wells in and about London, some of which derive their supplies from the sands under the blue clay; and others, to a greater or less extent, also from borings into the chalk,

and I think that, in most cases, the latter waters are the more pure ; that is, that in proportion as the borings are deepened into the chalk, the less are the solid contents of the water. There are in London and its vicinity some very deep wells which yet do not reach the chalk ; and others of a less depth, which are carried into it : arising out of the inequalties in the surface of the chalk, and the varying thickness of the blue clay itself ; so that the variations in the relative quantity of solid matter in the waters derived from these wells, is no criterion of their respective depths.*

The *shallow wells* of the London district, by which I mean those which do not penetrate the blue clay, but derive their supplies from the gravels and sands above it, yield water of varying quality, but always much less pure than that of the deeper wells, and generally abounding in sulphate of lime, and consequently eminently hard as respects the decomposition of soap, and other common culinary uses. There are many of these wells in which analysis detects indications of contamination by sewers, and by the vicinity of gas-pipes ; and some of them have been disused and filled up on that account. There are also, as is well known, many which are either in churchyards, or upon their boundaries ; and it is from these parish pumps that the neighbourhood often exclusively derive their supply of drinking water. I am at present examining the waters of several of these wells. In those which I have already examined, I have been struck with the abundance of *nitrates*, generally nitrate of lime ; and this, in some of them, is accompanied by what may be termed a large proportion of organic matter ; so large indeed, that on proceeding in one case to heat the dry residue of the water to redness, a deflagration ensued ; and yet this water is bright and colourless, has no unpleasant taste, and is abundantly resorted to as a very superior spring water by a very populous neighbourhood.

How far such waters may or may not be salubrious, is not a question here to be discussed; but in some cases there can, I suppose, be no doubt upon the subject, inasmuch as I have found two of these waters of an evident, though slight, brown or peaty tinge, as furnished from the well ; soon becoming brown on evaporation, and yielding abundant evidence of containing that species of humic extractive in which the adjacent soil no doubt abounds. I have in no instance been able to detect ammoniacal salts in any of these waters, but I presume that the nitric acid which they contain is the result of the oxidizement of ammonia.

It was my wish to have laid some of the results of these analyses more in detail before the Society; my apology for such imperfect details is, the hope that they may engage the attention of other analysts ; that the important subject of the condition of the waters of London and its vicinity may meet with the attention it deserves ; and that the comprehensive subject of the metropolitan supply of water may be scientifically, and accurately, and dispassionately considered, by those who are adequate to the task.

As regards the leading question of river supplies on the one hand, and artesian supplies on the other, I cannot, however, help expressing myself decidedly in favour of the former. Deep wells are pre-eminently valuable for local uses ; but, the peculiarities of the waters which they afford ; the depth from which, in many situations and under most circumstances, those waters must be raised ; the possibility, and I think I may say probability of the inadequacy of their supply ; and the chances of their mutual interference, are some of the circumstances which in my mind should be well weighed, before the gigantic scheme of the supply of the

* The chief peculiarity of these waters is derived from the presence of carbonate of soda, which, notwithstanding the large relative proportion of other salts which they often contain, confers upon them a peculiar softness as regards the soap-test, and seems to render them well adapted for domestic use, and especially for the infusion of tea and coffee.

metropolis from such sources is seriously entertained. On the other hand, pure river-water is already upon the surface, in various quarters, in unlimited quantity, and at no great distance; and when filtered, an operation which, as experience has shown, is attainable to any extent, its quality is in all respects superior. That many parts of London are badly and inefficiently supplied with water, and that in some places none is laid on, cannot be denied; but a slight movement in a proper direction, would, I think, remedy all real evils under this head. I must further beg leave to express my opinion in favour of the adequacy of the existing water companies to the accomplishment of all that can be reasonably required; the magnitude of their united means, the general excellence of their arrangements, the practical skill with which they have been devised and executed, and the resources which are still open to them where increase of supply is demanded, are the circumstances upon which I found this opinion.

I shall conclude with a short comparative Table, showing the relative quantity of solid matter contained in such river and spring waters as have been carefully analysed; intending, upon a future occasion, to extend the list, to give the details of the analyses, and the names of the analysts; in their present imperfect state, however, the following details will serve to illustrate some of the points touched upon in the preceding notice. The wells which are termed *deep*, derive their water from the strata below the blue clay, and some of them penetrate into the chalk; those termed *shallow*, are supplied from the strata above the blue clay. This is the case with most of the common London wells, which, however, are often steined to a considerable depth in the clay, for the purpose of forming a reservoir.

	Solid matter in the imperial gallon.
Thames at Greenwich	27.9
" London	28.0
" Westminster	24.4
" Brentford	19.2
" Twickenham	22.4
" Teddington	17.4
Average of the Thames between Teddington and Greenwich	23.2
New River	19.2
Colne	21.3
Lea	23.7
Ravensborne at Deptford	20.0
Combe and Delafield's Brewery, Long Acre. Deep well	56.8
Apothecaries' Hall, Blackfriars ditto	45.0
Notting Hill ditto	60.6
Royal Mint ditto	37.8
Hampstead Water-works ditto	40.0
Berkeley Square ditto	60.0
Tilbury Fort ditto	75.0
Goding's Brewery (Lambeth) ditto	50.0
Ditto shallow well	110.0
Moore's Brewery (Old Street) deep well	38.0
Ditto shallow well	110.0
Trafalgar Square Fountains deep well	68.9
Well in St. Paul's Churchyard	75.0
" Breams Buildings	115.0
" St. Giles, Holborn	105.0
" St. Martin's, Charing Cross	95.0
" Postern Row, Tower	88.0
Artesian well at Grenelle, near Paris	9.86

Quarterly Journal of the Chemical Society.

COMPOSITION OF THE WATER SUPPLIED BY THE HAMPSTEAD WATER-WORKS COMPANY.

BY MR. JOHN MITCHEL.

Analysis gave in 10,000 parts of water:—

Sulphuric acid	0.975
Chlorine	1.566
Silica	0.041
Lime	0.567
Potash	0.253
Soda	1.621
Phosphoric acid	0.039
Carbonic acid	0.694
Crenic acid	0.024
Apocrenic acid	0.012
Extractive	0.024
Iron and manganese	traces
Total	5.816

Annal. der Chemie und Pharm.

ARTESIAN WELL ON ISLINGTON GREEN.

For the following information respecting an artesian well, bored at Webb's Mineral Water-Works, Islington Green, the Editor of this Journal is indebted to the Proprietors of the well.

The total depth of the well is 220 feet; and the following table shows the thickness of the several strata (enumerating them from above downwards) through which the boring was made:—

Sand and gravel	12 feet
Blue clay	48 "
Mottled clay	70 "
Light sand with shells	10 "
Dark-blue clay	7 "
Dark sand and pebbles	13 "
Green sand and oxide of iron	10 "
Black sand and shells	3 "
Flints	3 "
Chalk and flints	44 "
Total	220 feet

The water, which is of excellent quality, formerly rose to within ninety-five feet of the surface; but after the working of the well at the Model Prison, Pentonville, the pump at the Mineral Water-Works became dry, and it was found necessary to lengthen the suction-pipe fifteen feet, but not to deepen the well. The water now rises to within 110 feet of the surface. For the last four years the supply has been good, and no alteration has been observed in the level of the water.

According to the recent survey, it appears that Islington Green is 99½ feet above Trinity high water-mark; and the Model Prison, which is distant from the Mineral Water-Works about ⅞ths of a mile, is at the same elevation.

USE OF ACETATE OF LEAD IN THE MANUFACTURE OF SUGAR.

TO THE EDITOR OF THE TIMES.

Sir,—The Royal Junta de Fomento of the island of Cuba, having been informed that some periodicals in this country have lately published various articles in which it has been asserted that the acetate of lead was employed in the manufacture of sugar in that island, has authorized me to declare, that in no part of the island of Cuba is either the acetate of lead, or any other substance prejudicial to health, made use of in the fabrication of sugar.

J. G. MIRANDA, Acting Spanish Consul General.

Spanish Consulate General, 37, *Old Broad Street*,
January 2, 1850.

OXYCHLORIDE OF LEAD FOR WHITE PAINT.

Mr. Pattinson, of Gateshead, has patented a process for the preparation of a white lead for painting, which is described as possessing qualities for that purpose superior to those of the common white lead :

"This compound the patentee calls oxychloride of lead. It consists of one atom of chloride of lead, united to one atom of oxide of lead, or Pb Cl + Pb O. To obtain this compound, the patentee dissolves pure chloride of lead in water, at the temperature of 212° Fahr., in the proportion of five-sixths of a pound to a cubic foot of water; and to convert this chloride into the above compound, he adds a solution of caustic lime, baryta, soda, or potash, in the proportion of half an equivalent of either, respectively ; but he prefers to use lime on account of its cheapness. When lime is employed, a saturated solution of it is made in cold water, in which case a cubic foot of such solution will contain half an equivalent of the chloride of lead contained in the cubic foot of the above proportions of chloride and water. Should the water employed contain sulphates or carbonates, these will precipitate a portion of the lead ; in such case it will be necessary to add more chloride than above specified, as it is necessary that the lime should never be in excess, as then the compound produced would not be white, but a mixture of white and litharge. When the above two solutions are prepared, they must be mixed suddenly together, and for this purpose, the patentee employs two tumbling boxes, placed over a cistern, each of about sixteen cubic feet capacity, these, being filled to the same height with their respective solutions, are suddenly inverted, and the solutions are mixed instantaneously in the cistern into which they fall. When the precipitate has subsided, the clear supernatant liquid, which consists of a weak solution of chloride of calcium, is run off into another cistern or tank, and more lime water is run into it, to precipitate any lead that may still remain in it. Although the patentee prefers to use the pure chloride of lead, impure chloride may be employed ; only in this case it will be necessary first to wash out any chlorides of iron or manganese that the impure salt may contain, and then, previous to proportioning the chloride and water, to ascertain the quantity of pure chloride present in the sample."—*Patent Journal.*

ON THE CONCENTRATION OF SULPHURIC ACID IN CAST-IRON POTS.

BY MR. RODER, APOTHECARY.

The platina stills used in large oil of vitriol manufactories are very costly, and the glass retorts, which were formerly employed for concentrating the so-called pan-sulphuric acid, are easily broken and inconvenient.

Mr. Roder, apothecary, tried therefore cast-iron enamelled pots, and satisfied himself that the enamel was not at all destroyed by boiling sulphuric acid. It is well known that enamelled vessels suffer much, if the contents are evaporated to dryness ; with liquids, however, even if they be strong acids, this is not the case, supposing that the enamel is very good, and properly fused.

The enamel of the cast-iron pots employed by *Roder* was prepared in the following manner :—1 part burnt alum, 4 parts red lead, 2 parts siliceous earth are ground as finely as possible, mixed together, and then fused till the mass flows gently; it is then plunged in water and again pulverized.

Of this powder, fifteen parts are triturated as finely as possible with twenty parts of siliceous earth, and three parts of tin-ash or oxide of tin, then rubbed down with oil of turpentine, and applied by means of a soft brush to the interior surface of a carefully polished and smoothly turned cast-iron pot; the operation is repeated three or four times, but not before the preceding coating has become perfectly dry. Pots with flat circular bottoms are the best for this purpose. The mode of fusing the enamel is known.

With regard to the concentration of the pan-sulphuric acid in these pots on a large scale, the best plan will be to have a heating-apparatus for four pots, each for two or three hundred-weight of acid. Larger pots would considerably increase the expense, whilst, by four or six such heating apparatus, with which sixteen to twenty-four pots can be constantly kept in operation, larger quantities can at once be concentrated, than have ever been concentrated in the largest platina still, and that at only the sixth or eighth part of the cost, not reckoning the expensive repairs which a platinum still requires from time to time.

ON THE ACTION OF NITRIC ACID ON IODIDE OF POTASSIUM.

BY DR. VOGEL, JUN.

In order to prove the presence of iodine in iodides by the blue colouration of the starch, sulphuric acid, chlorine or nitric acid have usually been employed. I have always preferred the latter, particularly in the experiments performed in my lectures; since, by a small excess of sulphuric acid too much iodine is liberated, in consequence of which the blue colour may become too deep. Sulphuric acid has, moreover, the disadvantage that if there be a small proportion of sulphurous acid present the reaction is prevented. Chlorine water, which may certainly be considered in this respect as the most sensible reagent, is inconvenient, because the smallest excess of it instantaneously decolourises the blue compound. Recently, however, it occurred to me several times that a solution of iodide of potassium mixed with starch-paste, assumed, upon the addition of nitric acid, even after some time, no blue colour, a circumstance which attracted my attention the more, as for years this experiment performed in the above-described manner never failed me. Thus induced to examine this subject closer, I mixed a concentrated solution of iodide of potassium with fresh prepared starch paste, and upon adding a few drops of nitric acid the mixture did not become blue, but after a few hours a slight reddish colouration showed itself. Even by heating it the blue colour did not appear, when a larger quantity of amylum had previously been added. When, however, the solution of iodide of potassium was heated with the nitric acid before the paste was added, the iodine was liberated, and was indicated by the starch. For this experiment nitric acid not concentrated had been employed, and which was perfectly free

from sulphuric acid, muriatic acid, and nitrous acid. When, on the other hand, commercial nitric acid, even in a diluted state, was employed, the blue colour immediately appeared. This acid always contains sulphuric acid and nitrous acid in varying proportions, and this impurity is required for the success of the experiment.

I have found that by adding the smallest quantity (not so much as one-half per cent.) of sulphuric acid, and also some nitrous acid, the pure nitric acid can be fitted for colouring the iodide of potassium starch-paste blue. The iodide of potassium starch-paste is consequently a very delicate test of the purity of nitric acid, for it is quite certain that nitric acid, which has no instantaneous effect upon it, is perfectly free from the usual impurities, namely, sulphuric acid, muriatic acid, and nitrous acid. It is scarcely necessary to observe, that nitric acid, when subjected to this test, must not be concentrated but diluted with water, as the perfectly concentrated acid, even if ever so pure, immediately decomposes the iodide-paste. If the nitric acid be very much diluted the iodide-paste is still a sufficiently delicate agent to detect nitrous acid.

LUNAR CAUSTIC WITH A METALLIC NUCLEUS.

Lunar caustic fused round a platina wire has been employed by *Chaissaignac* for operating with greater safety in cavities, where the fracture of the caustic might be dangerous. The lunar caustic thus applied adheres firmly to the wire, even when cracked.

ATOMIC WEIGHT OF LANTHANIUM AND DIDYM.

BY MR. C. MARIGNAC.

According to Marignac's researches the equivalent of *Lanthanium* is 588 (O=100) or 47.0 (H=1). The results of previous investigations are as follows:—

According to	Choubine	= 451.88
"	Rammelsberg	= 554.88
"	Mosander	= 580
"	Herman	= 600.

From Marignac's experiments we may assume that the equivalent of *Didym* is at least 620 (O=100) or 49.6 (H=1), perhaps somewhat higher. *Annal. der Chemie und Pharm.*

ON CREOSOTE AND CARBOLIC ACID.

BY DR. VON GORUP-BESANEZ.

I have convinced myself that the so-called Creosote, obtained from Frankfort, is almost pure carbolic acid, and that these two substances are by no means so related together as might be concluded from their respective composition and properties, for the products of decomposition are by no means equal in the two. By treating the Frankfort carbolic acid with chlorate of potash and muriatic acid, I readily obtained chloranil, which was absolutely not the case with the Bohemian creosote even after repeated experiments; the latter yielded *a yellow, oily substance of a penetrating aromatic smell*, which is perhaps identical with *Städeler's oil*, which this person obtained by treating starch with chlorine, and which he considers as a general product of decomposition of organic substances. From this oil, however, dark orange yellow crystals separated after some time, the small quantity of which did not admit of any extended examination. Neither could I obtain nitrospirolic acid (Laurent's nitrophenesic acid) from creosote by treating it with nitric acid.

TRICHROMATE OF POTASH.

If, according to Rothe, bichromate of potash be dissolved in common nitric acid at 60°, crystals are formed whilst the solution is slowly cooling. These consist of a mixture of two different salts, which can be mechanically separated. The trichromate of potash forms glittering, deep-red, oblique, rectangular prisms ; blackens by exposure to the atmosphere ; decrepitates slightly when heated ; and fuses at from 140° to 150° C. It dissolves readily in water and alcohol ; the latter solution, however, soon becomes decomposed in the air. It is anhydrous, and its formula is $KO+3CrO_3$. Mitscherlich has some time since noticed the existence of this salt.

BLACKING (*Liquid*).

Ivory black	8 oz.	
Treacle	6 oz.	
Vinegar	24 oz.	
Oil of Vitriol	1 oz.	(by weight)
Sperm oil	10 dr.	

To be mixed in the above order, in a mortar.

BLACKING (*Paste*).

Ivory black	2 lbs.	
Oil of vitriol	4 oz.	
Treacle	1 lb.	
Sweet oil	4 oz.	
Vinegar	5 oz.	
Sulphate of iron	½ oz.	
(Dissolved in hot water 5 oz.)		
Gum Arabic	¾ oz.	Mix.

ROBBERY BY MEANS OF CHLOROFORM.

Margaret Higgins and Elizabeth Smith, two women of notorious character, were placed at the bar before Mr. Arnold (at Worship-street), for further examination, charged with stealing a watch, wearing apparel, &c., from Mr. F. H. Jewett, Solicitor, of West Ham, and Lime-street City, while he was under the influence of chloroform.

Mr. Jewett, on the 10th of January, was walking slowly along the Whitechapel-road, when he felt some one touch his side, at the same time a rag was held before his mouth, and he immediately became insensible. Upon his senses being partially restored, he found himself naked, on a dirty bed, in a wretched apartment, with only a piece of rag thrown over him. His trowsers were on a chair, covered with mud, showing that he had fallen down, or had been dragged along the street. His watch, money, and some of his clothes were stolen. With much difficulty he made his escape, and has been seriously ill up to the time of January 24th, when he was reported to be delirious, and not able to attend on that day at the office. It was further stated, that a man named Gallagher, with whom one of the women cohabited, had been operated upon at the London Hospital, and that he had contrived to bring away with him some of the "stuff" with which he had been sent to sleep during the operation.

The prisoners were remanded for a week, to await the result of the alarming state to which the prosecutor is reduced.

The above is condensed from the *Times* of January 25th, and some of the circumstances are so marvellous that we can scarcely believe the statement to be literally correct. The instantaneous insensibility said to have been produced by the clumsy application of a rag to the face in the street, is not in accordance with what usually occurs when chloroform is administered by medical men, under the favourable circumstances of a hospital and a willing patient. We have generally observed that several inspirations are required, sometimes ten or twelve, before *complete* insensibility is produced. But in the above case, and several others which we have lately seen in the police reports, it appears that the victims became insensible before they have even time to push the rag away from their faces, that without a struggle they are passive and unconscious, and remain so for a length of time.

The manner in which the chloroform is said to have been obtained is scarcely credible, as it can scarcely be supposed that a patient could secrete and steal a bottle of chloroform from the operating theatre of a hospital, still less is it likely that the pickpockets in their first *debut* in the street should display the amount of skill and experience attributed to them. We fear the worst part of the mystery is not yet unravelled, and think it much more likely that the offence, if perpetrated as described, is a part of a system coming into fashion among the swell mob, which certainly demands investigation, and vigorous measures for its suppression. At the same time we think the *fact* (?) that the effects described were actually produced by chloroform requires further confirmation.

WESTMINSTER MEDICAL SOCIETY.

INSANITY FROM CHLOROFORM.

Dr. Webster related the following case, communicated to him by a professional friend, in consequence of perusing in the *Lancet* a report of the three similar instances he had mentioned at a previous meeting of the Society. Only one drachm of chloroform, sprinkled upon a handkerchief, was used ; but the effect it produced was so sudden and violent, that the patient, after inhaling, remained quite insensible, which greatly alarmed the attendants. With the insensibility there was likewise deadly paleness of the countenance ; however, she slowly rallied, but had a painful and protracted labour. During several days subsequently, the lady continued in a very nervous condition, although not then actually incoherent, but she soon became so furiously maniacal as to require coercion by a strait-waistcoat. After being insane during many months, the patient gradually recovered her reason, and ultimately got convalescent. Considering it was only from accumulated facts and extensive experience that sound practical knowledge respecting the employment of chloroform in midwifery could be acquired, Dr. Webster then said he had related the present, as likewise the previous examples of insanity following its use, in order to contribute data towards that important object ; and he availed himself of the present opportunity to state, that he should esteem it a favour if other practitioners would communicate to him any well-marked cases of the same kind, with particulars which they may have met with during their practice, as he (Dr. Webster) was very desirous of collecting additional evidence upon this interesting subject ; of course, on the express understanding that neither the patient's name should be divulged, nor the correspondent in any way compromised, all such communications will be considered strictly confidential in regard to individuals.—*Medical Gazette.*

[Other cases are required to prove that this was not a case of puerperal mania.—Ed. Pharm. Journal.]

ROYAL INSTITUTION.

The Friday evening meetings commenced for the ensuing season on the 18th of January, on which occasion, Dr. Buckland, who had been announced to Lecture on the supply of water to the metropolis by artesian wells, being prevented by ill health from fulfilling his engagement, Professor Grove supplied his place, by giving a brief sketch of some recent researches of continental philosophers.

He first adverted to the investigations of Regnault, made under the auspices of the French government, on the subject of *respiration.* The method of conducting the experiments was illustrated by a drawing, and the apparatus used for the analysis of the gases was exhibited and explained. He stated that the results of the experiments had tended to confirm, in their principal features, those previously made by Allen, Peppys, and others. Some interesting points had been determined, however, especially with reference to the respiration of animals. Thus, it was found, that small animals absorb much more oxygen, in proportion to their size, than large animals ; that cold-blooded animals absorb very little oxygen ; and that hybernating animals, while dormant, absorb both nitrogen and oxygen, and fatten on respiration. It was found also that the nitrogen of the air might be replaced by hydrogen, without any apparent alteration of the effect. This result was illustrated by placing a couple of sparrows under a receiver, filled with a mixture of oxygen and hydrogen resulting from the decomposition of water, and the supply of which was maintained by means of a galvanic battery.

Mr. Grove subsequently described some recent researches of Matteucci on *Animal Electricity ;* and he lastly referred to the investigations of M. Pasteur, a French Chemist, on the molecular condition of isomeric bodies. A double racemate of soda and ammonia was found by M. Pasteur to form two classes of crystals, having the same chemical composition, but differing in optical properties, even when in solution. Thus a solution of each kind of crystal being made in water, the one turned the plane of polarization of a ray of light to the right, and the other to the left, whilst a mixture of the two produced no deviation.

On Friday evening, the 25th of January, Professor Brande lectured on the Theory and Practice of the Manufacture of Sugar. He gave a full description of the process recently patented by M. Sevier and Dr. Scoffern, in which acetate of lead and sulphurous acid are employed.

TO CORRESPONDENTS.

Infant Orphan Asylum (Wanstead).—A correspondent requests us to notice, for the information of Chemists, the case of Benjamin Pearson Coleman and Frances Susan Coleman, who are candidates for admission into this institution. Their late father, a *Chemist,* of Lincoln, put an end to his life under pressure of poverty and despondency, leaving seven children destitute, all under eleven years. The youngest, aged four months, has lately died.

Beta (Carlisle).—(1.) Tincture of cantharides, added to pomatum, is frequently used to promote the growth of hair, about ℥j to ℥j may be used; but the proportions used are various. Spirit of rosemary is also employed with oil, and sometimes oil of mace and tincture of cantharides. We have no experience as to the efficacy of these preparations.—(2.) The young man alluded to would be admissible on passing the examination.

Enquirer.—Dissolve the soap in the water, and the wax in the turpentine, and mix.

Amicus.—A solution of bichloride of mercury is used to prevent dry-rot in timber, and might be available for arresting decay of a similar nature in other vegetable substances.

Q.Z.W. will find a formula for blacking in this number. The colouring matter in genuine aromatic confection is saffron. We cannot pretend to state what substitutes are used.

A Lover of Justice (Stockton) complains of the practice which he says is adopted by some Chemists, of retaining prescriptions which are brought to be prepared, for the purpose of obliging the customer always to come to themselves for the medicine in future. This is not the usual practice in England. It is a line of policy which cuts two ways. A customer, having lost one prescription in that manner, would be likely to take the next to another shop, where prescriptions are returned, according to the custom of the country. In France it is customary for Chemists to retain the original prescriptions, giving copies if required.

C. (Norwich).—(1.) Because the salt is neutral.—(2.) By means of a soluble salt of baryta, which is precipitated by sulphuric acid.—(3.) See Vol. vii., No. 7.

"*A Promoter*" should write to the secretary, with his name and address.

C.R.—Blaine's Veterinary Art.

A Subscriber.—The vendor of a patent medicine, whether wholesale or retail, must take out a patent medicine licence. He may keep an assistant, who need not have the licence; but an agent, selling on commission, is a patent medicine vendor, and is liable.

M.P.S. (Islington).—The suggestion will receive attention; but space will not admit of all that our correspondent desires.

Caw me, Caw thee.—The communication is clever and humorous, but personal, and might give offence, without producing the object desired.

The Medical Protection Society.—The efforts of this Society to deprive Chemists of the right of dispensing prescriptions having failed, it has for some time past devoted its attention to collecting the debts of Apothecaries, and now proposes to resolve itself into a bank, to *take care of* the money of its members, after having obtained it! The smallest deposits are thankfully received.

Cheap Mode of obtaining Morphia.—We accidentally forgot to mention last month a method of obtaining morphia, by which some of our members have suffered loss. A man, dressed like a gentleman, brings a prescription, ordering a mixture, and also a scruple of acetate of morphia to be used as directed. He takes the morphia with him, and says he will call for the mixture, and pay for both; but never calls again.

Amalgam for Stopping Teeth.—In default of practical experience, we are unable to give the information desired by several correspondents; but our friend, Mr. Arnold Rogers, has promised to favour us with a paper on the subject for next month.

Hebrew.—(1.) Yes.—(2.) Phillips's *Mineralogy.* A new edition is shortly expected.

R.J.W.—Benzole is a good solvent for copal. Rectified spirit, containing a little camphor, will also dissolve it when aided by heat.

W. B., M. P. S.—Alcoholic extract of Indian hemp should be used in making the tincture. An aqueous extract which is insoluble in spirit is sometimes sold, but it is worthless.

ERRATUM.—In the number for December, pages 275 and 276, for *mangoes*, read *mangroves.*

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the EDITOR, 338, Oxford Street, before the 20th of the month (if Answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. IX.—No. VIII.—MARCH 1st, 1850.

THE PHARMACOPŒIA.

Nearly two years have elapsed since the rumour that a new Pharmacopœia was about to make its appearance caused a sensation in the profession. This sensation was not attended with much excitement or sanguine hopes, but resembled that speculative curiosity which is elicited by an announcement respecting the probable passing of a medical bill, the repeal of the window tax, or the reduction of the pension list—subjects which are annually fired off in the form of blank cartridge, like the artillery at a review.

The Pharmacopœia had for several years been understood to be in progress; and in June, 1848, we were informed, on what we believed to be good authority, that the proof sheets were actually before the College, and the bundles of demy waiting for the fiat from Pall Mall East.

The anticipations founded on this intelligence were not realised. The new Pharmacopœia not having been completed, a reprint of the old edition has taken place. We understand that Mr. Richard Phillips is now engaged on the work, and we therefore hope that it will be completed by the time the old one is again out of print.

MEDICAL REFORM.

THE REJECTION OF PHARMACY AT LINCOLN'S-INN FIELDS.

When the proposition to establish a College of General Practitioners was first announced, we pointed out the retrograde character and injurious tendency of the proposed amalgamation of all grades and divisions of the profession into one heterogeneous compound. The project contained within itself the elements of impossibility, being founded on the principle of equal rank, equal qualification, and universality of talent, conditions incompatible with the known statistics of the human race. Pharmacy was involved in the proposition, as no provision was made for separating the profession from the trade in drugs. It is on this account that we animadvert on the subject.

After a hard fight, the scheme was abandoned by all parties, and generally acknowledged to be undesirable.

The next movement consisted in an endeavour to introduce "reform" into the College of Surgeons, and to adapt that venerable institution to the object in view. For this purpose it was proposed to extend the functions of the College to Medicine, Midwifery, and Pharmacy; to admit General Practitioners into the Council; and to modify the distinctions between Fellows and Members. In support of this proposition it was gravely urged that no person could be competent to practise Surgery unless he possessed also some knowledge of Medicine, Midwifery, and Pharmacy; and it was deduced from this admitted fact that, therefore, the College of Surgeons ought to include these

branches of knowledge in its curriculum! On the same principle arithmetic and the Latin language might be included, as a person unable to translate and understand a prescription, would not be able to write one.

It appears remarkable after it had been decided that a College of General Practitioners should not be established—that it should have been proposed to convert the College of Surgeons into a College of General Practitioners. This latter scheme, as well as the former one, has been warmly advocated by the Editor of the *Lancet* as a panacea for the privations and grievances sustained by the "13000 injured members of the College of Surgeons." In what manner it is calculated to effect the object, is not explained.

The Council of the College have decided against the amalgamation, adhering to their own legitimate province—Surgery, and declining to admit Rhubarb within their walls. That such a proposal should ever have been entertained is marvellous, and it is much to be regretted, that there are those in the profession, or connected with it, who perseveringly fan the flame of discontent by advocating that which is impossible, and which, if it were possible, could only be ephemeral.

The disposition to separate Pharmacy as much as possible from Medical and Surgical practice has of late years been gaining ground, and we are convinced that the rational mode of reforming the profession consists rather in the proper classification of its elements than in the union of all into a monster Frankenstein, a compound of mediocrity and incompatibility.

THE REPEAL OF THE WINDOW TAX.

We have alluded to this subject among those which have for some years past occasioned a slight periodical agitation to no purpose. There is reason to believe, that during the present session of Parliament the agitation will not be in vain. The fact is universally known and admitted, that the Window Tax is a tax upon health—that it causes the habitations of many persons, especially those of the poorer classes, to be imperfectly lighted and ventilated—and that it presses most heavily upon those who can the least afford to pay it. It would be impossible to say anything against the Window Tax which has not been said already. The public hate it, Boards of Health denounce it, the Government is ashamed of it; yet up to March, 1850, it still exists, in spite of the boasting about bills for promoting the public health, and utopian schemes for sanitary improvement.

For years past, it has been customary for deputations to wait upon the Secretary of State, praying for a repeal of this tax, and the following stereotyped answer was the result: "Yes, Gentlemen, we admit that you have proved your case, and a very strong one it is. The Window Tax is a great and serious evil, and we should be glad to repeal it as soon as possible. But before we can give a positive answer to your petition, we must request you to inform us what tax you would prefer in its place. All taxes are vexatious, but money we must have, and before repealing one tax, we must be prepared with a substitute." The deputation look at each other, but not being prepared to say

which new tax is the most "desirable," they pause—on which the minister expresses his great regret, and bows them out.

This farce has been acted so often, that in the absence of a change of circumstances we might have despaired of any other result. But fortunately the desired change has taken place, and the present is the time for a vigorous agitation—for a strong and united appeal which will take no denial. The account of the revenue and expenditure of the nation for the past year shows so large a balance in hand, that the question now to be decided is,—what tax shall be repealed? The public are on the alert; and if we may judge from the numerous public meetings, committees, petitions to Parliament, and instructions to members on the subject of the window-tax, we may infer that the public have determined the question—and whenever the public have arrived at a sound and firm determination in a case of this kind, affecting the welfare of the million, no Government can resist the accumulated pressure from without. We therefore feel persuaded that before the close of the present session the tax on light and air will be repealed.

THE BATTLES OF THE WATER COMPANIES.

Of the numerous projects lately in contemplation for providing the public with an improved supply of water, two only have passed the requisite ordeal for introduction into Parliament—namely, the Henley Company and the London (Watford) Spring-water Company; the former proposing to obtain water from the Thames at Henley—the latter from the Chalk Springs, near Watford. In reference to these rival projects, warm controversies have arisen respecting the comparative merits of wells and rivers, as a source of supply, both in regard to quality and quantity. Some interesting discussions have taken place at the Institute of Civil Engineers, in which the several theories have been explained and argued. From these and other late discussions on the subject, we have arrived at the following deductions:

1st. That according to the evidence of the *owners of mills*, the supply contained in the rivers and tributary springs would not be adequate to the demand.

2nd. The *owners of wells* deny the existence of a sufficient supply in the London basin, or chalk formation in the environs.

3rd. Professional *well-sinkers* and their agents give directly opposite evidence, declaring that the supply is fully adequate.

4th. The agents of each company flatly contradict those of the others.

5th. The old companies are not at present engaged in the controversy, but reserve their evidence for the parliamentary committee.

As the questions in dispute are of the highest importance to the public, and require for their solution a scientific investigation of the chemical and geological evidence within our reach, we intend to pursue the subject in our next number, for the purpose of giving a clear and impartial statement of the facts. Some information on the chemical constituents of the water will be found in another part of this number.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

MR. SQUIRE, PRESIDENT, IN THE CHAIR.

The following papers were read:—

ON THE RESIN OF THE NORWAY SPRUCE FIR.
(*Abies excelsa.*)

BY MR. DANIEL HANBURY, JUN.

In the Materia Medica of the London Pharmacopœia, two forms of the resin of the Norway Spruce Fir (*Abies excelsa*) are enumerated: one, *Abietis resina*, called Common Thus or Frankincense; the other, *Pix abietina* or Burgundy pitch. The latter is stated to be the resin in a prepared state (*Resina præparata*), the preparation essentially consisting in the removal of the impurities by straining.

The first of these substances, viz., *Abietis resina*, is rare in English commerce, and it was not until during a recent visit to Switzerland, that I had an opportunity of obtaining an authentic specimen. In many parts of that country this species of *Abies* is very abundant, forming extensive and beautiful tracts of forest. The resin exudes spontaneously from fissures in the bark of the tree, and especially from those places where branches have been broken off. When it first issues, it is sometimes quite transparent and liquid, but is more commonly found opaque, and of a pale yellow colour and soft consistence. By exposure to the air, it hardens and becomes of a browner tint. Some of the hardened tears are internally white and opaque, like drop ammoniacum, the broken surface acquiring a pink hue by exposure to the air. The odour is peculiar, terebinthinate, cheesy, and rather aromatic; the taste slightly bitter.

The article now sold as *Abietis resina*, is believed to be imported chiefly from America, and in odour and colour much resembles common American turpentine hardened by age. It usually occurs in large agglutinated masses, whose surfaces when long exposed become transparent, brittle, and of a deep yellow colour. Internally, they are soft and opaque, pale yellow marbled with whitish patches. The odour is that of common American turpentine, though not so powerful. Some of this resin appears to have exuded spontaneously, and contains such impurities as small chips of wood, sticks, leaves, &c. The leaves are evidently not those of the Norway spruce fir.

When genuine *Abietis resina* is melted in hot water, strained and cooled, we obtain Burgundy pitch, as a very pale, yellowish brown substance, almost entirely soluble in cold alcohol, easily softening in the hand, and having a peculiar, agreeable, aromatic odour. Burgundy pitch, apparently genuine, is imported from Hamburgh in tubs called *stands*, each containing about one hundred pounds, but it is usually in so impure a state as to require straining, sometimes a rather difficult process involving considerable loss. It is moist, of a greyish buff colour, speedily becoming dark on the surface by exposure to the air; when strained it acquires a browner hue, and is very adhesive. It was formerly called Rhine pitch, to distinguish it from another imported variety now seldom seen, which was designated Baltic pitch.

Baltic pitch is a brittle resin, externally transparent, and of a bright yellowish brown colour, internally pale buff, and very opaque. Its odour is slight but agreeable, though wanting the peculiarity of that of genuine Burgundy pitch. I know not its botanical origin.

Artificial Burgundy pitch, apparently intended as an imitation of the sort last described (since it strikingly differs from the Hamburgh or genuine sort) is manufactured in London and elsewhere, and is sold in bladders, as a clean, brittle resin, very moist, of a fine orange yellow colour, and having but little odour and taste. It does not completely dissolve in cold alcohol.

Other varieties of spurious Burgundy pitch are employed on the continent, but as they do not occur in English commerce, it seems unnecessary here to describe them.

In answer to some questions, Mr. Hanbury stated that he believed the resin of the Spruce Fir was not collected as an article of commerce in the districts which he had visited, and from which he had obtained his specimens. The trees grow to a considerable height, often more than a hundred feet.

EAST INDIAN SENNA.

Mr. Jacob Bell, in reference to a communication on this subject in the last number of the *Pharmaceutical Journal*, page 361, introduced to the notice of the meeting several samples of senna, namely, three of Alexandrian (picked "sorts," and small), and three of East Indian (Tinnevelly, common East Indian, and Dr. Gibson's, from Bombay). The latter was the sample sent to the Society by Dr. Royle, in order to afford an opportunity of examining its quality. Infusions of the above samples of senna were on the table. Of these the common East Indian yielded the deepest coloured infusion; Dr. Gibson's not quite so dark; the Tinnevelly the lightest; while the Alexandrian was intermediate in tint. Mr. Bell observed, that he had introduced the subject with a view of pointing out a mode by which he thought the Society might exercise a beneficial influence in checking the adulteration of Alexandrian senna. It was well known that this senna was systematically mixed, consisting of lance-leaved and obovate senna with cynanchum, the latter constituting about one-fifth of the whole. It had been said by some persons that cynanchum answered the purpose as well as senna. It griped and it purged, and there was no reason why those who prefer it should not have it. But he contended that those who desire senna should equally be accommodated with what they want, and that if the profession would make a firm stand against the prevalent fraud, and refuse to purchase the mixed article, self-interest would induce the collectors to send genuine Alexandrian senna to suit the demand. Dr. Gibson's senna resembled in appearance the lance-leaved senna found in the Alexandrian. Its smell and condition being much superior to the common East Indian, it might be useful to introduce it by way of competition, to drive the mixed article as much as possible out of the market. When compared with what is often sold as Alexandrian senna, it certainly was superior in appearance, besides being a genuine senna. Its medicinal qualities had been tested abroad with a good result; and an opportunity was now afforded for testing it in this country, a

consignment having been made to Messrs. Lewis and Peat, of Mincing Lane. If the result should be favourable, a further supply could be obtained, as every facility existed for its cultivation. If no other advantage were derived from the introduction of this senna, it might assist in driving the Alexandrian mixture out of the market. This had already been done in Edinburgh, where the Tinnevelly senna was generally used, at the recommendation of Dr. Cristison, who had directed attention to the subject some years ago. But the supply of Tinnevelly senna not being nearly sufficient to supplant the Alexandrian, Dr. Gibson was conferring a benefit on the profession by his endeavours to extend the cultivation of the plant. Mr. Bell considered that, in reference to questions of this description, the Pharmaceutical Society might beneficially exert its influence, by investigating the comparative merits of the productions, and encouraging the introduction of those which are known to be genuine, in preference to others which are notoriously and systematically sophisticated.

Two samples of Tinnevelly senna, from Mr. Hill, of Little Britain, were on the table, one of which was remarkably fine, being a fair sample of eleven bales out of fifty-seven imported last month.

The Chairman observed, that in the selection of senna, which he was in the habit of doing by sample, he paid particular attention to the fragrant odour, which ought to resemble that of fresh good tea. In this respect, he found the Alexandrian senna superior to any other kind, but the sample on the table (from Dr. Gibson) more nearly approached the right odour than the ordinary East Indian senna. Alexandrian senna differed very much in quality, in regard to colour, the condition of the leaves, and also in the proportion of cynanchum mixed with it.

Mr. Humpage observed, that Tinnevelly senna is much more used in the west of England than it is in London. At Bristol, for instance, it is very generally kept by the Druggists.

A Member from Bath confirmed the above statement; and said that, at Bath, Tinnevelly senna is sold as one of the best varieties of senna, at the same price as the picked Alexandrian.

Mr. Tustin, of the London Hospital, stated that at their institution, East India senna was the only kind used. It made a darker infusion, which was considered rather an advantage, and was found to be perfectly efficient as a purgative. When associated with the usual correctives, it was not found to be in any way objectionable.

ON AMALGAMS FOR STOPPING TEETH.

BY ARNOLD ROGERS, ESQ.

I have much pleasure in communicating, through the Pharmaceutical Society, a few remarks on amalgams, as well as the formula for the one I have used for some years; and although occasionally some specimens have come under my observation, which seemed to possess qualities superior to the general character of amalgams, yet, on the whole, I have been satisfied with my own compound. Not but that I think it may be improved upon; and, when leisure time will allow me, I shall endeavour to profit by the hints and communications of my professional brethren.

It should be thoroughly understood, that whenever gold foil can be used, it ought to be; and, in the majority of cases, it can be. In my opinion, amalgams should be used only when the cavity of the tooth is so large as to endanger a fracture of the walls, by the pressure required to weld the gold foil, or when the tooth is too tender to allow pressure upon it from any cause. I may be permitted to observe, however, that frequently a tooth will be exquisitely sensitive when amalgam is applied; yet, at the expiration of twelve months or more, the amalgam will appear to have had the effect of removing all tenderness, and a perfect gold foil plug can be introduced without the slightest pain to the formerly tender cavity.

For some years, in our early knowledge of amalgams, nothing but silver coin was amalgamated with mercury. This, from discolouring the teeth so much, gave rise to improvements in that respect; and, although it formed a very hard and useful compound, its tendency to oxidation was a great objection to its use, especially in the side-front of the mouth. Other amalgams were substituted, and among them pure silver amalgam, which does not discolour when both the silver and mercury are *perfectly pure* (as in all amalgams the metals must be, to ensure perfect results); but it is too friable for long endurance, and is not so much used as formerly. Amalgams of platinum, and of gold and platinum, have been much used, and with pretty good results, though, from some cause or other, I have found them variable in the preparation.

A new compound has lately been introduced to us by Mr. Evans, of Paris, in the "Dental News Letter," for January, 1850. He describes his compound, which is an amalgam of tin and cadmium; and although it has not succeeded to the extent of his anticipation, yet he merits our thanks for his undisguised and honourable communications on the subject—perhaps as much for his retractation *under his sanction*, as for its introduction. It certainly promised, in the outset, to be a great boon, principally from its great facility of application and endurance of colour. Its title to this latter property, however, is questionable in many cases, and, in some patients of delicate health, it is subject to the same objection as any other of the amalgams. A more perfect compound is, however, now being tested, introduced by Mr. Robertson, of Birmingham; and no doubt that gentleman will not allow the liberality of our American brother to surpass his; but Time, the great test of all things, is necessary for its rejection or adoption.

All the compounds which contain copper quickly become discoloured: the amalgam is more compact, but its black colour in front is most objectionable. Even gold having a trace of copper in the compound, soon becomes black.

I was favoured with a communication, a few months ago, by a gentleman, who has for some time employed an amalgam of palladium, and it certainly carried evidence of a very beautiful preparation, as compact and of finer texture than the amalgam I use; but I *fancied* it was slightly more discoloured than mine.

I will now give the instructions necessary for preparing the amalgam I have so long used. The convenience of the parties making it may, however, alter this mode, without injury to its efficacy; but

as most dentists have a solution of nitrate of silver at hand, resulting from their work-room, they may employ it without any loss.

Chloride of silver is prepared by precipitation from the nitrate by adding common salt. A pasty deposit immediately takes place; and, when all the silver is thrown down (which is known by the addition of a few drops of hydrochloric acid not rendering the fluid turbid), it should be washed and drained, so as to leave a pasty mass. Into this a piece of zinc is immersed. In the course of two or three days (according to the quantity submitted), all the silver will be reduced to the metallic state; you then remove the zinc. To ascertain the weight of silver you have to amalgamate, it is necessary to weigh the piece of zinc before submitting it to the paste, and the loss of weight which the zinc sustains will be equivalent to the weight of metallic silver produced. To this may be added six or eight times its weight of pure mercury, which must be triturated in a mortar, with warm water, for several hours, or so long as the mass continues in the least to discolour the water. The operator will discover the pasty adhesiveness which the amalgam will acquire as he proceeds; and for this part of the process it is better to have an excess of mercury, which can be squeezed out, and should leave, at the conclusion of the operation, an amalgam composed of one part of silver and four parts of mercury. This amalgam of silver is to be united with an amalgam of gold.

The amalgam of gold may be prepared by putting ribbons of pure gold (similar in thickness to that which gold beaters commence beating with) into heated, or nearly boiling, *pure* mercury, and in the proportion of four mercury to one gold. This may be poured into a mortar containing water, and washed, as the silver amalgam, so long as the least discolouration appears in the water. This should be freed of its superfluous mercury, and the mass should consist of gold one part, mercury three parts.

It may be well to observe, that these amalgams retain a little water in the interstices of the mass; and to prevent any displacement from the spoon in after use, it is well to dry them, by gently rubbing them with a soft towel, or upon bibulous paper.

The amalgams being now perfectly pure, it may be well to keep in separate boxes the little pellets necessary for combination of the compounds; and the proportions are two parts by weight of the gold amalgam to one of the silver. I have found it to become a more compact mass by the first crystallization, although, should there be any residue, it may be heated, and rubbed up again, with a fresh supply for a future operation. The two pellets had better be triturated thoroughly in a mortar before the compound is submitted to the flame of a spirit lamp; and I have observed that, for the better incorporation, it is necessary to submit it to heating and trituration in the usual way, three or four times. The cavity of the tooth being quite prepared for the reception of the amalgam, all the mercury that can be pressed out between the thumb and fingers should be so separated, and the compound immediately packed in the cavity. A little nicety is requisite in keeping, by gentle trituration, between the thumb and finger, the compound in as hard, and at the same time as pasty a state as possible, so as to prevent it becoming friable or crumbling during its introduction.

16, *Hanover Square*, *Feb.* 11, 1850.

Mr. Bartlett stated that he had found the alloy of cadmium, tin, and mercury, a very good amalgam for the teeth. He had prepared it for some time past, and no complaints had been made of it.

Mr. Davenport recommended collodion as an excellent substance for stopping decayed teeth. If the aperture in the tooth be well cleaned out, rendered perfectly dry, and then filled with some of the collodion, which has been previously allowed to become very viscid, the collodion will speedily harden in the cavity and adhere firmly, forming a perfectly unobjectionable stopping.

TEST FOR DISTINGUISHING ACETONE FROM PYROXYLIC SPIRIT.

Mr. Scanlan made a communication on this subject, the publication of which is deferred until next month.

SPONTANEOUS DECOMPOSITION IN GUN-COTTON.

BY T. H. TUSTIN, ESQ.

Several months ago I prepared some gun-cotton for the purpose of making collodion according to the formula at page 169, vol. viii., of the *Pharmaceutical Journal*. It deflagrated, detonated, and exploded, behaved indeed in all respects just as good gun-cotton should. I put it away in a corked bottle in a dark closet, the temperature of which is always a degree or two above the ordinary temperature of the atmosphere, and I have only opened the bottle occasionally to take some of the cotton out to dissolve. A few weeks ago, I was astonished to see the bottle full of reddish brown vapours, and to find the cotton had lost much of its explosibility. It has now a strongly acid taste (when made it was washed perfectly free from acid), and on testing it I find evidences of nitric and slight traces of sulphuric acid. The latter acid I find, by referring to the Journal, is stated by M. Mialhe to be always present in cotton prepared by this process. Dr. Pereira has been kind enough to examine its optical properties for me, and he reports thereon as follows: "It is well known that *common cotton* is a powerful depolarizer; and when examined with the microscope by the aid of polarized light and one of Biot's sensible plates (*i.e.* a thin film of sulphate of lime) it presents magnificent colours. *Gun-cotton* does not depolarize light, and therefore does not show the colours in polarized light.

"Your *decomposing gun-cotton agrees with common cotton*, though its depolarizing properties are somewhat weaker. Either, therefore, the cotton was not originally properly prepared, or it has resumed its former optical characters, and simultaneously has given out an oxide of nitrogen (either NO_2 or NO_4)."

I have every reason to believe the cotton was properly prepared—and then the questions arise: Is not gun-cotton under some circumstances liable to spontaneous decomposition? Is this the case with all gun-cotton; or is it peculiar to that made by M. Mialhe's process?

These questions I take to be important and worthy the investigation

of Chemists, and that is my reason for introducing my cotton to your notice.

It is still soluble in ether.

London Hospital, Jan. 18th, 1850.

Mr. Bell exhibited a specimen of gun-cotton, made several months ago, in the same way as that described by Mr. Tustin, and which had been kept in a bottle, the mouth of which was covered with tinfoil. This specimen appeared to have undergone decomposition, and the tinfoil had been completely destroyed by the action of acid fumes.

Specimens of the unprepared cotton, of good gun-cotton, and of that which had undergone decomposition, were exhibited under the microscope with polarized light.

SPURIOUS TANNATE OF ALUMINA.

The Chairman said, there were other papers to be read which must be deferred until the next meeting. Before they separated, however, he wished to direct the attention of the Members present to a specimen of a salt on the table, which was labelled *Tannate of Alumina.* This salt had been introduced to the notice of the medical profession by a manufacturing Chemist, who supplied it to the retail trade. Many medical men had been induced to prescribe it as a styptic, presuming it to be what its name indicated, a definite chemical compound of alumina and tannic acid. On examination, however, it was found to be nothing more than a very impure specimen of common alum. It was necessary that such a fraud upon the profession should be promptly exposed.

Mr. Bell stated that the article was prepared by Mr. Peche, and was ordered in prescriptions as Peche's tannate of alumina. As such, it was sold on the responsibility of the maker, but should not be supplied when tannate of alumina is ordered in general terms.

LIVERPOOL CHEMISTS' ASSOCIATION.

On Wednesday, February 6, the society again met after a recess, and Mr. Hamilton commenced a course of lectures on the Elementary Gases, which have been continued weekly, and proved highly instructive and interesting.

PHARMACEUTICAL MEETING,

Royal Institution, Colquitt Street, Friday Evening, February 15,

THE PRESIDENT IN THE CHAIR.

Dr. Inman delivered the first of two lectures on Therapeutics; confining himself to the consideration of the specific action of medicines—taking examples from certain metals and their salts. Thus mercury, lead, iron, silver, arsenic, antimony, &c., have each their individual action on the system, which character is maintained by each salt; this power appears to be independent of chemical action, and in many cases, as in iodide of potassium, the salt passes off from the system without undergoing decomposition. Many also act particularly on certain organs, as lead on the tartar of the teeth, forming a characteristic blue line on the gums; silver on the skin; arsenic on

the mucous coat of the stomach; iron on the blood; mercury on the salivary glands, &c. &c. These actions Dr. Inman described in detail, giving many interesting cases; also pointing out those metals that did not possess this characteristic, and whose salts were possessed of very opposite actions on the system, as copper, barium, bismuth, &c.

Dr. Brett made some observations on the minute quantity of these medicines capable of exercising their specific action on certain individuals. Thus mercury, in very minute doses, was capable of producing salivation. He had seen the peculiar blue line, indicating lead, in the gums of a family, caused by the admixture of rain-water with spring, in a leaden cistern, dissolving the lead. A small portion of tartarized antimony ointment had been known to produce pneumonia; and the citrine ointment applied to the edges of the eyelids salivated.

Mr. Edwards made some remarks on the paper by Mr. Danson in the last Journal, and one by Dr. Muspratt in *The Chemist*. The quotations from Kane, Graham, and Taylor appeared to him quite irrelevant, and those from Liebig and Gregory by no means conclusive. He was surprised that Riensch's test had been avoided by those gentleman, as he thought it had many advantges over Marsh's test, which was known to be uncertain when organic matter was present. He had himself made several experiments on the subject, which he had communicated to the Chemical Society of London, at a recent meeting; and these had led him to very opposite conclusions to those arrived at by these gentlemen. He had found that the whole of the arsenic in the mixture of albumen described, may be removed by patient trituration with hot water in a mortar; and that the quantity dissolved in the water by this method was equal, when precipitated as sulphuret, to the quantity of arsenic employed. He also found the coagulated mixture was poisonous, having destroyed a rabbit and guinea pig; and that hot water was also capable of removing the whole of the arsenic from the mucous coat of the stomach of the animals thus poisoned. From these facts he concluded that neither in the compound formed in the laboratory, nor in that prepared by nature, by absorption in the stomach, did the arsenic exist as an organic compound, but in a state of mechanical mixture. He urged members of the society to repeat the experiments, and satisfy themselves on the subject.

Mr. Mercer said that, though he had in his first experiment believed he had obtained the organic compound, he had, on repeating his experiments several times, come to the same conclusions as Mr. Edwards, and had no doubt the mixture was mechanical. If a compound was so readily formed, why was not albumen an antidote for arsenic?

Mr. Walker had repeated these experiments, and found similar results to Mr. Edwards.

Dr. Brett made a few remarks in confirmation of the experiments.

At the next meeting, Dr. Inman will resume his lecture, and will consider the specific action of organic salts.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE NATURE AND EFFECTS OF THE ORGANIC MATTER IN DRINKING-WATER.

We stated in our last number in general terms that one of the characteristics of a good wholesome water, suitable for culinary and other domestic uses, consists in its comparative freedom from organic matter. We say comparative, because no water exposed to ordinary atmospheric agencies, is, or can be, absolutely free from such contamination. So much has latterly been promulgated respecting the "organic matter" contained in the metropolitan drinking-waters, that we ought not to pass over the subject without placing the facts of the case in their proper light, and correcting some erroneous notions now in circulation.

What is "*organic matter?*" Many persons who are in the habit of frequently employing this phrase have never, perhaps, asked themselves this question; and some even have rather an indefinite idea of the meaning of a term with which they must be familiar. To say that organic substances are those which either are produced in the animal and vegetable kingdoms, or arise from the decomposition of such as are thus produced, is to take our definition from the origin, and not from the nature, of the matters in question. By what character or property can we distinguish an organic from an inorganic substance when we are unacquainted with its origin? Chemistry alone can resolve this question; and, we believe, that Leopold Gmelin's definition is the only one which will be found to be universally applicable. "Organic compounds," says this learned Chemist, "are simple compounds, containing more than one atom of carbon;" and he goes on to explain that by the term "simple compounds," he means those which (unlike such bodies as bi-carbonate of potash) cannot be formed out of other compounds. Carbon or charcoal, therefore, is the only essential constituent of organic matter. But every body which contains carbon is not necessarily an organic substance. Carbonic acid, for example, is not organic, as it does not come under the definition of a substance containing more than one atom of carbon.

The organic matter of drinking-waters are of two kinds—one organized and living, the other dead and decomposing.

1. *Organized and living matters.*—Under the head of organized or living matters are included both animals and vegetables.

a. Of the *animals* with which our river waters are tenanted, it is proposed here to allude to those only which, by reason of their minuteness, are called *animalcules*, or *microscopic animals*. But this group is a very motley one, and embraces beings of a most heterogeneous and diversified structure. It includes infusory animals, entozoons, polypes, insects, annelides, crustaceans, &c.

"In every drop of dirty stagnant water," says Ehrenberg, "we are generally, if not always, able to perceive, by means of the microscope, moving bodies, of from $\frac{1}{1150}$th to $\frac{1}{25000}$th of an inch in diameter, and which often live packed together so closely, that the space between each individual scarcely equals that of their diameter."

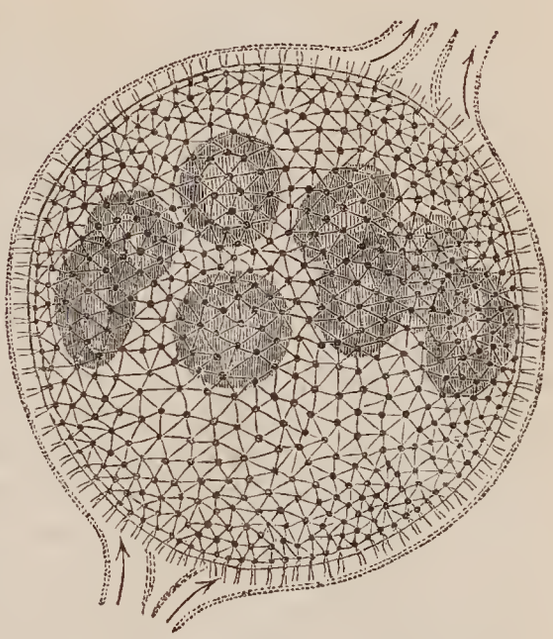
Statements like these, though literally true, lead to very exaggerated notions in the public mind of the actual animalcular impregnation of

the ordinary drinking-waters supplied to us by the water companies; and the erroneous impressions thus obtained have been heightened by the public exhibitions of aquatic animals, by means of the oxy-hydrogen microscope. The animals shown on these occasions are usually larvæ of insects, which are oftentimes an inch or more in length, and are caught in stagnant pools around the metropolis.*

Some years ago, at one of these exhibitions at the Adelaide Gallery, an old lady inquired whether the animals shown were found in the water which people were in the habit of drinking? "These insects, ma'am," gravely replied the exhibitor, "are contained in New River water"—an answer which was literally true; for the animals had been the day previously caught in a pond at Hampstead, and had been transferred to New River water.

We have recently subjected to careful microscopic examination New River water, taken from a leaden cistern, which had not been cleaned out for many months, and which was loosely covered, and placed on the roof of a house. We detected in it a very small number only of animalcules *(infusoria* and *entomostraca)*. The season was, however, not favourable to the examination; the largest number of these organisms being found in the summer months.

Fig. 1.



Volvox globator (The globe Volvox)

Of the *Infusory Animalcules* more than 700 species have been described and figured by Ehrenberg, and of these a large proportion inhabit fresh waters.† Of the *polygastric* class may be mentioned the families Monadina, Cryptomonadina, Volvocina (fig. 1), Vibrionia, Peridinaea and Kolpodea, as of frequent occurrence; and of the *rotatory* class, we may mention the families Hydatinea, Philodinaea, and Brachionaea as being common.

The *Entomostracans* (so called from ἔντομος *an insect*, and ὄστρακον *a shell*) or *Monoculi*, are another kind of animalcules of frequent occurrence in river waters. They are crustaceans, which are covered with a thin, horny tegument in the form of a shell, and consisting of one or two pieces. A few months since (see *Pharmaceutical Journal* for December, 1849, p. 281) a correspondent sent us figures of three species, namely, a *Daphnia* (perhaps *D. Pulex*, fig. 2) and two species of *Cyclops*, viz, *C. Castor* and *C. quadricornis*, which he had found in some drinking-water. In his *Natural History of the British*

* Mr. William Bond, of No. 1, Emma Street, Ann's Place, Hackney Road, is a well-known purveyor of living objects for the oxy-hydrogen microscope.

† In Mr. Pritchard's *History of Infusoria* 732 species, comprised in 188 genera, are described, and many of them figured. To this useful work our readers are referred for the best and fullest account in the English language of these interesting animalcules.

Entomostraca,‡ Dr. Baird (who has described about 120 British species) observes that "the greater number of these little creatures are furnished with branchiæ, either to their feet or maxillæ, and when noticed in their native habitats, may be seen to have them constantly in motion, their action being seldom interrupted. One chief use of them, therefore, in the economy of nature, may be, as Müller says, to ventilate the water day and night; as they chiefly reside in standing pools, they may thus be of great use in preventing them from becoming soon putrid." And he goes on to observe that, "though they are most abundant in stagnant water, they yet occur in considerable numbers in the purer sorts of water that serve as our common drink, and may be frequently seen even in the drinking-water of London, Edinburgh, and other large towns."

Fig. 2.

Daphnia Pulex (female). (The water-flea, with branched horns, of *Baker*).

Of the ill effects produced on the health of man by the use of water contaminated by infusory and entomostracan animalcules, we have no evidence to adduce. The employment of waters known to abound in these beings is repugnant to our feelings, and calculated to excite alarm; but we are unacquainted with any injurious consequences therefrom. Nature has assigned to these creatures their appropriate habitations, and when by accident they are introduced into the stomach they are in general unable to survive. And of those which do live and grow in the human machine (the true parasitic infusoria), Vogel observes, that their presence in the living body is of little or no pathological importance. "The invisible infusoria," says Ehrenberg, "are sometimes hurtful, by causing the death of fish in ponds, deterioration of clear water, and boggy smells; but not, as has been supposed, in giving rise to malaria, plague, and other maladies." With regard to the entomostracans, although, like the infusory animalcules, they must be daily swallowed alive, along with their eggs, they have not hitherto been found in the body, and no injurious effects have been recognized to result from them; but, as Müller observes, we should not be surprised were we to discover them some day in the human intestines.

Cases are on record illustrating the ill consequences arising from the introduction of leeches and larvæ of insects, &c., along with drinking-water, into the stomach and bowels. Larrey § has given an interesting account of the ill effects on the French soldiers in Egypt, produced by drinking muddy water containing the small Egyptian leech (*Sanguisuga Ægyptiaca*).

β. The *plants* which grow in fresh waters serve the very important purpose of yielding oxygen (by the decomposition of carbonic acid and water), which, being distributed through the liquid, not only

‡ Just published by the Ray Society. This interesting work contains figures of the British Entomostracans.

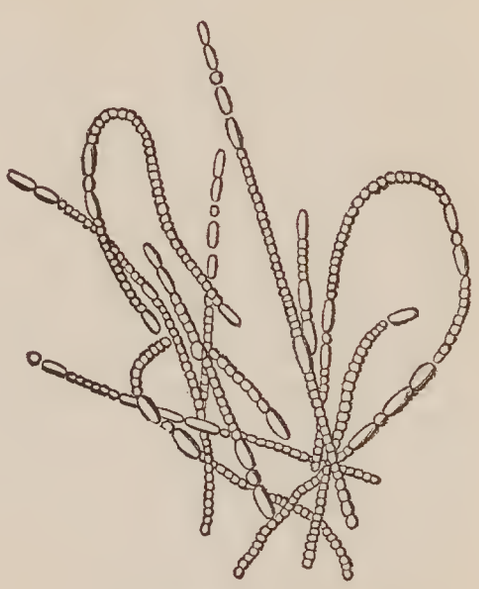
§ Quoted by Dr. Pereira, *Elements of Materia Medica*, vol. ii., p. 1833, second edition.

contributes to the support of the animal tenants, but also assists in converting the decomposing organic matter into simpler and more permanent forms of matter. In some cases even the medicinal qualities of mineral waters have been ascribed to the large quantity of oxygen set free by aquatic vegetation. Robiquet obtained from the Néris water gas containing forty-four per cent. of oxygen, derived from the *Oscillatoria labyrinthiformis*, and he ascribed the medicinal qualities of these waters to the presence of this very oxygenated air; and not without some appearance of reason, for Dr. Edwards has shown that the life of batrachians is greatly affected by the air contained in water, and it is not improbable that in some cases the human organs also may be under its influence. *Conferva rivularis*, or crow-silk, has been even used in medicine by Murray, in asphyxia, asthma, and phthisis, on account of the oxygen which it evolves in solar light. Some confervals are peculiarly abundant in both hot and cold sulphur springs. *Calothrix nivea* (fig. 3) is met with in the sulphur springs of Yorkshire, Durham, and Aix-la-Chapelle; and *Sphærozyga Jacobi* (fig. 4), another indigenous conferval is found in the Karlsbad waters.

Fig. 3.

Calothrix nivea (Snowy conferva.)

Fig. 4.



Sphærozyga Jacobi.

The cryptogamic plants of our drinking-waters are chiefly *Algæ*, belonging to the sub-orders *Diotomaceæ* (including the *Desmidieæ*) and *Confervaceæ*. To these, perhaps, may be added the *mycelium*, or spawn of *fungi*.

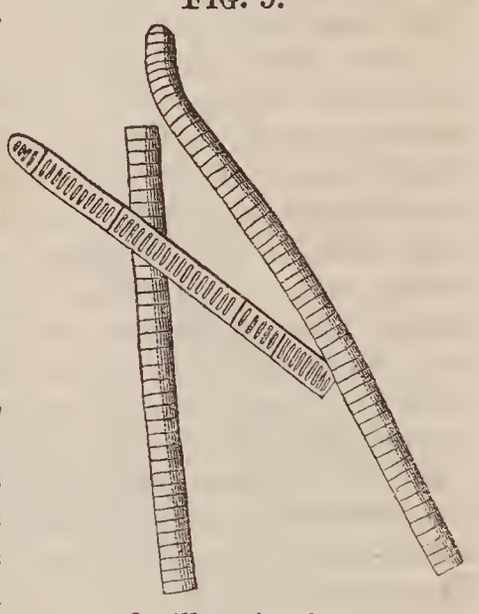
The organic substance of mineral waters, which has been variously called *barégine* by Longchamp, *zoogen* by Gimbernat, *theiothermin* by Monheim, and *glairine* by Anglada, is a glairy or mucous-like substance, which is said to communicate the flavour and odour of flesh-broth to the water in which it is contained. It is, probably, a mass of confervals, or is derived from them. In preparing artificial mineral waters (sulphur baths), of which this substance is a constituent, Pharmaceutists and medical men represent it by glue, and the baths are then denominated *balnea sulphurosa et gelatinosa, or Dupuytren's*

gelatino-sulphurous baths, formulæ for the preparation of which are found in many of our works on Materia Medica (*e. g.*, Dr. Pereira's *Elements*, vol. i., p. 483, 3rd edit.)

But to return to the more immediate object of this paper—what, it may be asked, are the ill effects on the animal frame of the confervals contained in our drinking-waters? Small fish (gold-fish, minnows, &c.) as well as the common warty newt (*Triton cristata*) are sometimes destroyed by a small parasitic plant apparently of a confervoid nature. The disease usually commences at the tail, which becomes covered by a kind of white cottony efflorescence, and is gradually destroyed. The disease ultimately spreads over the body of the animal, whose death is thus produced by it. The malady appears to be contagious; for when one fish becomes affected with it, unless it be removed, the others in the same vessel soon become attacked also. We have tried to kill the plant by dipping the tail of the yet living fish in oil of turpentine, but have not succeeded. If this parasitic plant be examined by a microscope it will be found to consist of articulated or cellular tubes, some of which contain granules and one or two nuclei.

Are human beings subject to any similar disease? On this point further evidence is required. Dr. Arthur Farre has described the case of a woman who passed by the bowels substances having the ordinary appearance of shreds of false membrane, but consisting entirely of compound filaments, probably belonging to the genus *Oscillatoria*, or at any rate allied to it. The patient drank the ordinary water which supplies London; but we have no evidence to prove that she in this way imbibed the reproductive sporules of this plant. As an illustration of the genus *Oscillatoria*, we subjoin a figure (Fig. 5) of the *O. nigra*, found by Dillwyn (who calls it *Conferva fontinalis*) in the New River, at Hornsey.

FIG. 5.



Oscillatoria nigra.
(Brownish spring conferva).

In the *aphthæ* (thrush) of children, and on the false membranes which cover the mucous membrane of the mouth and throat in diphtheritis of the adult, and on ulcers of the mucous membrane of the alimentary canal in typhus, similar confervoid filaments have been found. Whether in these cases, as well as in those above-mentioned, filaments are really confervals, or are the mycelium or spawn of fungi (the Hyphomycetes of Fries), we will not undertake to decide. Their vegetable nature, however, is unquestioned; and it is equally certain that filaments akin to them are common in fresh waters.

Of the parasitic filamentous plants, which have been found on the skin, and on the pulmonary mucous membrane of the human subject, we do not think it necessary to say anything here; but refer those interested in the subject to Robins's work, entitled *Des Vegetaux qui croissent sur l'Homme et sur les Animaux Vivants.*

2. *Dead and Decomposing Organic Matter.*—No sooner have organized beings ceased to live, than their bodies commence to decompose.

The process of decomposition may be retarded or hastened by various circumstances; but we are fully authorised in affirming that it commences immediately that life leaves. The complex organic constituents then begin to revolve themselves into simpler and more permanent forms of matter; and after passing through various transitory states, their carbon is ultimately converted into carbonic acid, their hydrogen into water, their nitrogen into nitric acid, their sulphur into sulphuric acid, and their phosphorus into phosphoric acid. These changes can only be effected by the aid of oxygen; and the general character of the alteration which these organic matters effect on surrounding bodies, is that of deoxidization. If free oxygen be not at hand, they rob other compounds of it. Thus, if a solution of sulphate of soda and decomposing organic matter be contained in a bottle, from which atmospheric oxygen is excluded, the decomposing organic matter robs the sulphate of soda of its oxygen, and thus sulphur, in combination with hydrogen, is set free. This fact led the late Professor Daniel into a remarkable error, which deserves to be here noticed, because a similar kind of error may be made by others. In sea-water, brought from the western coast of Africa, Professor Daniel found sulphuretted hydrogen; and he in consequence thought that the existence of this deleterious gas in the atmosphere, which must necessarily accompany its solution in the waters, was connected with the awful miasma which proves so fatal to the explorers and settlers in the deadly shores of Africa, as well as other places. But the gas which he obtained from these waters must have been developed after they were bottled; for neither in the river nor sea-water of Western Africa, when fresh collected, could Dr. M'William or Dr. Pritchett detect the slightest trace of sulphuretted hydrogen. There can, therefore, be little doubt, that when decomposing organic matter is contained in water freely exposed to the air, it obtains its required oxygen from the atmosphere, and not from the dissolved sulphates.

In Mr. Homersham's Report to the Directors of the London (Watford) Spring-Water Company, the writer mentions the disgusting odour which is emitted by drawing the cork from a bottle in which Thames water has been kept excluded from the atmosphere for three or four weeks in summer. But there is no evidence that this water if it had been freely exposed to oxygen in its native stream, would have yielded the same disgusting products. The experiment is altogether one from which a person unacquainted with chemistry may draw a very erroneous inference.

It is well known that Thames water, when carried to sea in casks, soon becomes putrid and offensive, and even evolves inflammable vapour—a phenomenon which has also been observed with respect to other waters. This of course is owing to the decomposition of organic matter, partly contained in the water, partly derived from the wood of the cask; for Dr. Wilson, in his *Statistical Reports of the Health of the Navy, for the Years* 1830—1836, says, that the substitution of iron tanks for casks has remedied this evil; and the water can now be kept for any length of time without being offensive, either to the palate or nose.

In chemical analyses of drinking-waters, the organic constituents figure under the various names of "organic matter," "extractive

matter," "crenic acid" (crenic from *κρήνη a well or spring*), and "apocrenic acid" (apocrenic from *ἀπό from*, and *κρήνη*). These two acids appear to be modifications of humus, and are probably derived from decaying vegetable matter. Some of the other forms of organic matter are derived from decaying animal substances, and the London well-waters are sometimes contaminated by the contents of sewers and drains, as well as by gas-tar which has escaped from the gas-pipes of the streets.

"In addition to its saline or natural impurities," says Mr. Brande, "the well-water of London is sometimes contaminated by organic matters, the source of which, especially in the pump water of churchyards, is sufficiently obvious; and such is usually the place selected for the parish pump. This disgusting source of water should be avoided; and the disgraceful system of burying the dead in the streets of the metropolis should be authoritatively discontinued. Of this nuisance abundant instances occur to every one who walks about London; the churchyard St. Clements, in the Strand, is a fair specimen, and there are many infinitely worse.* In these the same graves are repeatedly opened, and the coffins thrust in one upon another, according to the most inexplicable system; and it is beneath this superstratum that the waters of the adjacent wells flow, in some instances, perhaps, deep enough to avoid direct contamination, but never free from the suspicion of the oozings of the vicinity."

In his account of the well-water of the Royal Mint (published in our last number) Mr. Brande states that in the examination of the waters of the parish pumps in churchyards or upon their boundaries, he was struck with the abundance of nitrates, generally nitrate of lime, which these waters contain; and "this in some of them accompanied by what may be termed a large proportion of organic matter." This fact of the oxidation of the nitrogenized constituents of organic bodies, and the nitrification going on within the bowels of the earth, is a most interesting and important one. So large was the quantity of organic matter and nitrates, says Mr. Brande, "that on proceeding in one case to heat the dry residue of the water to redness, a deflagration ensued, and yet this water is bright and colourless, has no unpleasant taste, and is abundantly resorted to as very superior spring-water by a very populous neighbourhood."

In the year 1828, when the public mind was greatly excited by the statements of Mr. John Wright, the author of *The Dolphin*, Dr. Lambe, who had long entertained certain peculiar notions respecting the cause of constitutional diseases, published a pamphlet, entitled, *An Investigation of the Properties of the Thames Water*, in which he announced the existence of arsenic in this water. The substance, which he supposed to be arsenical, was a sublimate having some general resemblance to metallic arsenic. The tube was hermetically sealed, and to our knowledge has never been subsequently examined. Our opinion is, that the sublimate was a charcoally one, arising

* In the *Report on the Health of Towns* (*Effect of Interment of Bodies*), dated 14th of June, 1842 (327), it is stated that this pump has been obliged to be shut up, as the water was found unfit for use.

from the decomposition and volatilization of some organic matter. We have no doubt that it was the same kind of pseudo-arsenical sublimate which, at a later period, deceived the celebrated toxicologist Orfila, and led him to erroneously announce the existence of arsenic in the bones and muscles of healthy men.

We now come to the consideration of the most important part of our subject, the effects on the human frame of decomposing organic matter contained in drinking-water. We are inclined to believe that the ill effects have been greatly exaggerated. Decomposing organic matter in suspension or solution is found in every river water in greater or less proportion; but in general the quantity is too small to act injuriously; and those waters which are so strongly contaminated with organic matter as to have an obviously injurious action on the system, are obnoxious to the senses, and disgusting to the stomach. When the quantity is too small to affect the palatable qualities of the water, it is by no means easy to obtain decisive evidence of its injurious effects on the system. The immediate effects of a glassful of foul water would be nausea and sickness, and, perhaps, slight relaxation of the bowels. In those cases in which the noxious influence has been unequivocally recognised, the symptoms produced have been those of diarrhœa or dysentery. One of the best-established instances of the effects on animals of water loaded with putrescent matter is that which has been published by Dr. Pereira. His account of it we subjoin:—

"At the Nottingham assizes, in July, 1836, it was proved at a trial (Jackson *versus* Hall), on which I was a witness," says Dr. Pereira, "that dysentery, in an aggravated form, was caused in cattle by the use of water contaminated with putrescent vegetable matter, produced by the refuse of a starch manufactory. The fish (perch, gudgeon, pike, roach, and dace) and frogs in the pond, through which the brook ran, were destroyed. All the animals (cows, calves, and horses) which drank of this water, became seriously ill; and in eight years the plaintiff lost twenty-four cows and nine calves, all of a disease (dysentery) accompanied by nearly the same symptoms. It was also shown that the animals sometimes refused to drink the water; that the mortality was in proportion to the quantity of starch made at different times; and that, subsequently, when the putrescent matter was not allowed to pass into the brook, but was conveyed to a river at some distance, the fish and frogs began to return, and the mortality ceased among the cattle. The symptoms of illness in the cows were as follows: the animals at first got thin, had a rough staring coat, and gave less milk (from two to three quarts less every day); they then became purged, passed blood with the fæces, and at length died emaciated and exhausted. On a *post-mortem* examination, the intestinal canal, throughout its whole length, was found inflamed and ulcerated. The water, which I examined, was loaded with putrescent matter, and contained chloride of calcium (derived from the chloride of lime employed in bleaching the starch). Traces of free sulphuric acid were occasionally found by one witness."

The inhabitants of the village who had been accustomed to obtain their drinking-water from the brook, ceased to employ it so soon as its sensible qualities indicated the presence of a large quantity of putrescent matter. Doubtless, had they continued its use, they, like their animals, would have suffered from diarrhœa and dysentery.

Dr. Cheyne gives the following notice of the supposed production or continuance of dysentery from the use of water holding putrescent organic matter in solution or suspension; but the connection between the use of the water and the disease is by no means well made out.

"Dr. M. Barry affirms that the troops were frequently liable to dysentery while they occupied the old barracks at Cork; but he has heard that it has been of rare occurrence in the new barracks. Several years ago, when the disease raged violently in the old barracks (now the depôt for convicts), the care of the sick was, in the absence of the regimental surgeon, entrusted to the late Mr. Bell, surgeon, in Cork. At the period in question the troops were supplied with water from the river Lee, which, in passing through the city, is rendered unfit for drinking by the influx of the contents of the sewers from the houses, and likewise is brackish from the tide, which ascends into their channels. Mr. Bell, suspecting that the water might have caused the dysentery, upon assuming the care of the sick, had a number of water-carts engaged to bring water for the troops, from a spring called the Lady's Well, at the same time that they were no longer permitted to drink the water from the river. From this simple, but judicious arrangement, the dysentery very shortly disappeared among the troops."

Dr. Copland, in his evidence before a Committee of the House of Commons, stated that water which percolates through soil abounding in animal matter becomes injurious to the health of the individuals using it. This fact, he says,

"Has been proved on many occasions, and especially in warm climates; and several very remarkable facts illustrative of it occurred in the Peninsular campaign. It was found, for instance, at Ciudad Rodrigo, where, as Sir James Macgregor states in his account of the health of the army, there were 20,000 dead bodies put into the ground within the space of two or three months; that this circumstance appeared to influence the health of the troops, inasmuch as for some months afterwards all those exposed to the emanations from the soil, as well as obliged to drink the water from the sunk wells, were affected by malignant and low fevers, and by dysenteries, or fevers frequently putting on a dysenteric character. The digestive operations are affected by water abounding with putrid animal matter; so that burying in large towns affects the health of individuals—in the first place, by emanations into the atmosphere, and in the second place, by poisoning the water percolating through that soil."

In the Registrar-General's returns for the 5th of January, 1850, there is a statistical report respecting the cholera in the districts of nine metropolitan water companies, from which it appears that—

"Arranging the twelve groups of districts in the order of mortality, it appears that the mortality from cholera was lowest—or 10, 17, and 23 to 10,000 inhabitants—in districts which have their water chiefly from the Thames so high as Hammersmith and Kew. Upon the other hand, the mortality was highest—or 131, 156, and 268 to 10,000 inhabitants—in the districts which have their water from the Thames so low as Battersea and the Hungerford Bridge. The districts of the New River occupy an intermediate station."

We suspect, however, that we should grossly deceive ourselves were we to assume, as the above figures appear to shew, that the

severity of the cholera depended on the quality of the drinking-water supplied to the inhabitants of these different districts. This is one out of many cases in which statistical returns may lead to erroneous inferences. If all the districts supplied by these different companies were equally salubrious—if they were *on an equal level above the high-water mark*—if they were equally well drained, and populated by an equal number of persons in every square mile, &c., &c., the conclusions as to the injurious influence of the quality of the drinking-water, on the mortality from cholera, would then have some real value. In their present form, however, they are worthless.

In an investigation of this description, the object in view is the establishment of the truth, and this object can only be attained by an unbiassed consideration of evidence fairly collected and arranged. The prejudices of the public are sufficiently alive to the disgusting properties of polluted water; and the case when correctly stated is forcible enough, without the aid of unsubstantiated inferences or illogical deductions, based rather on preconceived theories than on well-ascertained facts.

THE WATERS OF THE METROPOLIS.

Having briefly described the most essential qualities of a water suitable for alimentary and other domestic uses, we proceed to inquire how far the specified conditions are fulfilled in the several kinds of water now supplied to the metropolis. In doing this it will be desirable to classify the waters of the metropolis according to the nature of the sources from which they are derived.

The waters used in London are obtained from several different sources, and they may be distinguished as follows :—

1. Rain-water.
2. River-water.
   - From the Thames.
   - " New River.
   - " Lea.
   - " Colne.
3. Lake or Pond Water.
4. Well-water.
   - From deep wells.
   - " Shallow wells.

1. *Rain-water.*—This kind of water is very little used in London, for although, when collected in some localities, it constitutes a very pure water, which is valuable for certain purposes, yet the smoky atmosphere of London, and the circumstances under which alone it can be collected, contribute to its contamination to a great extent, so as almost entirely to preclude its use. Rain-water is by far the softest of the London waters. It is not only free from those saline impregnations which give to waters the character of hardness, but, from the circumstance of its containing carbonate of ammonia in solution, it is more soft than it would be if perfectly pure. It is sometimes col-

lected from the roofs of houses, but in consequence of the soot and other impurities with which it is always contaminated, it is unfit for use until it has been filtered, or partially purified by subsidence. After being so treated, it may be advantageously used by laundresses, and for some other domestic purposes, but it is liable to become impregnated with lead if kept in leaden cisterns, or supplied through pipes of that metal.

2. *River-water.*—The principal part of the water used in London is derived from rivers, and chiefly from the Thames. There are seven water companies by whom river-water is supplied, and of these five, namely, the Grand Junction, West Middlesex, Chelsea, Southwark and Vauxhall, and Lambeth, supply Thames water.

The Grand Junction Water-Works Company, which originally supplied the water of the river Colne, conveyed to London by the Grand Junction Canal, has long ceased to take water from that source, and now draws its supply from the Thames, about a quarter of a mile above Kew Bridge, opposite to Brentford, but on the Surrey side of the river.

The West Middlesex Company take their supply from the Thames, near Barnes.

The Chelsea Company are supplied from the same source at Battersea.

The Southwark and Vauxhall are also supplied at Battersea.

The Lambeth Company take their water from the Thames between Hungerford and Waterloo Bridges.

All these companies adopt some process, more or less inefficient, for the purification of the water, either by filtration or subsidence, before supplying it to their customers. We shall have again to revert to this subject.

A great number of analyses have been made of Thames water, taken from different parts of the river, and it has been found that the quantity of solid matter contained in the imperial gallon varies from 17.4 grains, which is the smallest quantity, to 28.5 grains, which is the greatest quantity found. The latter result is that which has been obtained in London, and the former at Teddington. The difference appears to relate principally to the amount of organic matter present. Thus, on comparing the analyses of two specimens of water, one taken from the Thames at London Bridge and the other at Twickenham, fourteen miles higher up the river, we find the amount of organic matter in the former to be 6.99 grains, and in the latter 3.48 grains in the imperial gallon, being a difference of one-half, while in the inorganic constituents there is a difference of only ten per cent., the quantities being, at London Bridge 21 grains, and at Twickenham 18.9 grains. The inorganic salts consist principally of bicarbonate and sulphate of lime, and chlorides of calcium and magnesium, on which the hardness to the water depends, together with a little chloride of sodium and sulphate of soda.

With regard to the inorganic constituents of Thames water, it may be stated that, while those salts are present which render the water agreeable and salubrious, and completely prevent its becoming contaminated by the action of leaden pipes and cisterns, the earthy salts are not so abundant as to make it a decidedly hard water. It may be designated as a moderately soft water.

The principal objection to Thames water is caused by the extent of its contamination with organic matter, to which we shall hereafter allude more in detail.

But London is partly supplied with water from the New River and the River Lea. The former of these is a canal, by which the waters of the Chadwell and Amwell springs, in the neighbourhood of Ware, were originally brought to London; but these sources having proved insufficient, the New River Company now take part of their supply from the Lea, which river also supplies the East London Company.

The waters supplied by the New River and East London Companies have not been so frequently or so carefully analysed as those of the other companies. The analyses that have been made, however, show that, in regard to the quantity and quality of the saline matter contained in them, there is very little difference between these waters and that of the Thames. The New River water is represented to contain 19.2 grains, and the water of the Lea 23.7 grains of solid matter in the imperial gallon. The proportion of earthy salts, which give the character of hardness to the water, is very nearly the same in all the river-waters supplied to London. Mr. Brande found the degrees of hardness in these waters, as determined by Clark's test, to be as follows:—

	Degrees of Hardness.
Thames Water—At Medenham	17
,, Grand Junction Company	$15\frac{1}{4}$
,, West Middlesex Company	$14\frac{1}{10}$
,, Chelsea Company	$15\frac{1}{4}$ to 16
,, Southwark and Vauxhall Company	$15\frac{1}{2}$ to 16
New River Water	$15\frac{1}{2}$ to $16\frac{1}{10}$
Lea Water—East London Company	17 to $17\frac{1}{4}$
Colne Water—At West Drayton	$16\frac{3}{4}$ to 17

The whole amount of solid matter contained in an imperial gallon of each of the above specimens, was found to vary only between 20 grains, the smallest quantity found in New River water, and 23 grains, the greatest quantity found in Thames, Colne, and Lea waters.

For all practical purposes, therefore, these waters may be considered to be identical, in regard to the inorganic substances contained in them.

(*To be continued*).

ON THE QUANTITATIVE DETERMINATION OF SUGAR AND STARCH BY MEANS OF SULPHATE OF COPPER.

BY H. FEHLING.

During my experiments on diabetic urine, which occupied me for more than two years, I endeavoured to obtain some method of determining the amount of sugar in the urine; and not being in possession of a suitable polarizing apparatus, I tried Barreswil's method by a solution of sulphate of copper. After numerous experiments, I satisfied myself that the test is a trustworthy one, provided that the cupreous solution is of such a composition that it does not undergo decomposition when boiled by itself. In Roser's and Wunderlich's *Archiv. f. physiol. Heilkunde*, 1848, p. 64, I published the method which I adopted in examining saccharine urine, and

mentioned at the same time that I also employed it for technical purposes, in determining the quantity of saccharine matter in turnips, as well as of starch in potatoes and corn. Since that time I have repeated these experiments for the purposes just mentioned, as well as for determining the amount of saccharine matter in grape-juice ; and I have assured myself that this method is well adapted for technical purposes, since the result is readily obtained by it, and is as near to the truth as is in such cases required. With regard to urine, I have convinced myself by a solution of a given quantity of pure diabetic sugar in normal urine, that the constituents of the latter do not affect the determination of the proportion of saccharine matter.

I have also mixed sugar of grapes in solution with pectin, tannin, and mucilage in small quantities, and found that the results were unaffected. In order to contrast these experiments, I also determined the quantity of saccharine matter in grape juice by fermentation, when I found in a proportion of eighteen to twenty-two per cent. of sugar, 0.4 to 0.8 per cent. less than with the copper test, which may partly arise from the latter test giving too high a proportion, partly because a small proportion of saccharine matter easily escapes fermentation when the solution is not sufficiently diluted. Diluted grape-juice precipitated with acetate of lead, and filtered, yielded the same proportion of saccharine matter as before the precipitation. In apple-juice, the copper test showed a small quantity of saccharine matter, more in raw-juice than in that previously precipitated by sugar of lead.

The Solution of Copper contains, as is well known, sulphate of copper, neutral tartrate of potash, and caustic lye. It is indispensably necessary that these constituents should be in the proper proportion, for if this be not the case, the solution soon becomes decomposed in the light, without the addition of sugar, and instantaneously in direct solar light, and likewise by heating or boiling: protoxide of copper or a green basic salt, and, in the heat, a brown oxide also are separated. Such a solution changes perceptibly quick, and gives unequal results. The following solution of copper can be preserved for two years without undergoing any change ; it may be boiled for a length of time without becoming in the least decomposed : Forty grammes of pure crystallized sulphate of copper are dissolved in about 160 grammes of water, and this solution is gradually added to a solution of 160 grammes of neutral tartrate of potash, dissolved in a small quantity of water, mixed with from 600 to 700 grammes of caustic soda lye of 1.12 specific weight ; I then dilute the whole to 1154.4 cubic centimetres, at 15° Cent.

The Solution of Sugar.—In order to determine the quantity of the copper salt reduced by a given quantity of sugar, I first took cane-sugar, which had been converted into grape-sugar by boiling with tartaric or sulphuric acid. On this occasion, I observed that the results were sometimes inconstant, in consequence of the latter proportions of the cane-sugar being but very slowly changed. I preferred, therefore, pure granular sugar. I took sugar from honey, and such as had been obtained from urine, and which had been perfectly dried at 100° Cent., and had yielded on analysis the correct elementary composition of C_{12} H_{12} O_{12}. I first determined the weight of protoxide of copper, which was obtained by a given quantity of granular sugar with some *excess* of the copper solution; the quantity of the protoxide was determined by heating it with nitric acid or with oxide of quicksilver, and thus changing it into oxide of copper. From 180 parts by weight of granular sugar, I always obtained between 375 and 395 parts by weight of oxide of copper; *i.e.* for one equivalent C_{12} H_{12} O_{12} (180) 10 equivalents oxide (10×39.75). The reason why the result obtained is somewhat less than the calculated result, is, that in washing

it in the atmosphere, a small quantity of the protoxide of copper is constantly oxidizing and becoming dissolved.

Secondly, I determined the proportion of copper-salt for grape-sugar, by adding to a certain volume of copper solution, a filtered solution of sugar till all the copper salt was completely precipitated ; in these experiments too I required for one equivalent of granular-sugar (180) ten equivalents of sulphate of copper (1247.5). One litre of solution of copper prepared as above stated, contains 34.680 grammes of sulphate of copper, and consequently requires for its reduction five grammes of dry granular sugar (C_{12} H_{12} O_{12}) for 34.650 : 5 = 1247.5 : 180 or = 6.930 : 1. Ten cubic centimetres of the solution of copper correspond therefore to 0.050 grammes of dry granular sugar.

Mode of Procedure.—In examining a saccharine solution, I dilute a certain weighed quantity of it to ten or twenty times its volume in cubic centimetres, so that it contains at the most one per cent. of sugar. Of grape juice, for example, I take ten grammes, and add so much water that the volume of the liquid amounts to 100 cubic centimetres.

I then dilute ten cubic centimetres of the solution of copper with forty cubic centimetres of water, heat the liquid to the boiling point, and add solution of sugar until all the copper is reduced. The nearer this point approaches the more abundant and the more intensely red is the precipitate, and the quicker also does it fall down. A small quantity of this filtered liquid must not show any re-action of copper if tested with sulphuretted hydrogen, or ferrocyanide of potassium*. If the filtered liquid contain an excess of sugar it soon assumes a yellowish colour. Such an experiment being, with some practice, performed in a few minutes ; a second one is easily undertaken in order to discover the exact moment when all the copper salt is reduced by the smallest possible quantity of sugar. As the copper salt is instantaneously reduced by the sugar a continuation of the boiling is not required if the solution of copper be only kept in a boiling state, or near the boiling point. The sugar immediately reduces the corresponding quantity of copper, and without a fresh addition of sugar no further reduction takes places, even if the boiling be continued.

The volume of the employed solution of sugar contains, according to the foregoing statement, 0.050 grammes of grape-sugar. As the quantity of sugar in the liquid is in an inverse proportion to the volume employed, it is necessary, in order to obtain the per centage proportion of sugar, to divide 5 by the consumed quantity of the sugar solution in cubic centimetres, when the latter was not diluted, if it was, however, diluted, *e. g.* twenty-fold, then $20 \times 5 = 100$ is to be divided by the consumed cubic centimetres.

If solutions containing greater quantities of sugar, as grape-juice, which contains twenty per cent., are not intended to be diluted, a proportionately greater quantity of solution of copper must be employed in order to diminish the error of observation. I prefer, however, to use a dilute solution of sugar for many reasons. I dilute a certain number of grammes of saccharine urine, or grape-juice, as already mentioned, to ten or twenty times the volume in cubic centimetres ; $\frac{5.10}{n}$ or $\frac{5.20}{n}$ (where n is the number of cubic centimetres of the saccharine solution employed for ten cubic centimetres of solution of copper) is then the per centage proportion of grape-sugar (C_{12} H_{12} O_{12}) in the liquid examined. Instead of the volumes here given, others may be employed ; *e. g.* twenty cubic centimetres of solu-

* When the ferrocyanide is used as the test, the liquid must be feebly acidulated with hydrochloric acid, because, in alkaline fluids, no precipitate is produced even when copper is present.

tion of copper, corresponding to 0.100 grammes $C_{12} H_{12} O_{12}$, &c., and I take this proportion generally in testing grape-juices, which are very rich in sugar. The liquid may also be determined by the weight, instead of by the volumes, both by grains and grammes. In order to save the trouble of calculation, I will quote here some of these proportions in weight.

We make a solution of one ounce of sulphate of copper, three ounces of tartar, one ounce and a half of pure potash, fourteen to sixteen ounces soda lye (of 1.12 sp. weight) and 13,852 grains of water = twenty-eight ounces six drachms and fifty-two grains. 1000 grains of this solution contain 34.65 grains of sulphate of copper, which correspond to five grains of grape-sugar. The solution of copper, when employed, is diluted with four times its quantity of water, and so is also the solution of sugar. The quantity of sugar is calculated after the stated proportion, so that 200 grains of the solution of copper require for reduction one grain of $C_{12} H_{12} O_{12}$.

In order to determine the quantity of cane-sugar by means of the copper solution, we must first change it by the action of sulphuric, or tartaric acid, into fruit-sugar; at the same time it must be heated for several hours in order to completely change all the cane-sugar.

The same proceeding is to be adopted with starch. We have here no other test but by taking out now and then a sample till the employed quantities remain equal to one another.

By these tests we now obtain the quantity of grape-sugar proportional to the cane-sugar or starch, and from this grape-sugar we easily calculate the quantity of the latter, since 100 parts of weight of grape-sugar, $C_{12} H_{12} O_{12}$=95 parts of cane-sugar, $C_{12} H_{11} O_{11}$, or to 90 parts of anhydrous starch, $C_{12} H_{10} O_{10}$.

That foreign substances which are contained in the urine or vegetable juices, do also reduce or precipitate a small quantity of copper, is very likely. The proportion found after this test may, therefore, frequently be somewhat too high, chiefly with some vegetable juices; but many of these foreign substances can be easily removed by a small quantity of acetate of lead. This easy and speedy method is, therefore, best adapted for technical purposes, where absolute accuracy is of less importance than quick and easily obtained results.

Mr. Schwarz employed for testing the starch in a moist way (See *Annal d. Chem. und Pharm.*, by Wöhler and Liebig, vol. lxx., p. 54) a similar solution of copper as that described above; his results, however, vary in so far, that according to him one gramme of starch changed into sugar will only reduce three grammes of sulphate of copper, or 162 of starch correspond to 486 solution of copper, *i. e.* $\frac{486}{124.75}$=3.9, or nearly four equivalents of the latter—one part by weight of starch sugar will therefore dissolve only 2.7 parts by weight of sulphate of copper, whilst I always reduced by the given quantity of sugar 6.9 parts of sulphate. These differences made it necessary to repeat the experiments of Mr. Schwarz: the solution of copper prepared after his prescription has this advantage, that it contains less caustic lye and tartrate of potash than that prescribed by me, but in the sun it instantaneously becomes decomposed; in daylight after some time, and very readily when heated on the water-bath, and at the same time protoxide of copper falls down. It appeared to me best to try it by mixing it with less pure grape-sugar than is required for a perfect decomposition, and to determine the quantity of the produced protoxide of copper. In several such experiments which I caused to be made 0.180 grammes of pure diabetic sugar produced 0.420 to 0.470 grammes oxide of copper, whilst by my solution 0.397 grammes were obtained, and after Schwarz's statement only 0.159 grammes of

oxide ought to have been the result from the latter. That in those experiments made with pure grape sugar, more oxide of copper was obtained than ought to have been formed, is perhaps explicable by the circumstance that part of the protoxide of copper was reduced by the heat; that Schwarz obtains less copper is, perhaps, a consequence of the imperfect conversion of the starch into sugar.—*Ann. d. Chemie u. Pharm.*, Bd. lxxii., Heft. 1.

ON THE ACTION OF SUGAR AND SULPHURIC ACID ON ORGANIC SUBSTANCES.

BY DR. M. A. SCHULTZE.

In Müller's *Archi.* V. for the year 1848, p. 502, Professor Fr. Will recommends Pettenkofer's bile-test (which consists in imparting, by means of sugar and sulphuric acid, a violet-red colour to the bile) as the safest method of recognising micro-chemically the secreting organs of bile and the latter itself, not only in animals who possess them distinctly, but also and chiefly for proving the existence of such organs, or at least the presence of bile in such animals in whom they have as yet not been discovered, and he repeats his recommendation in a small pamphlet, "On the Secretion of Bile. Erlangen, 1849."

Expecting to obtain interesting results with regard to the physiology of the lower animals, I repeated Will's experiments, and extended them as much as possible to many invertebrata. My attention, however, was drawn to the fact that every time I placed animals in a saccharine solution, and added, as Will advises, sulphuric acid, all the soft parts of the small Crustacea, Annelida, Entozoa, Planaria, Polypes, and Infusoria, which I had employed, displayed uniformly a light red colour, passing into a dark violet-red; and that under the microscope not the slightest difference could be discovered between the colour of those organs which actually contained bile, or may be supposed to contain it (namely, the liver and intestinal canal), and that of the other parts of the body. Finding myself thus disappointed in my expectations, I resolved upon discovering the conditions on which this beautiful colouration of organic substances by sugar and sulphuric acid depended.

I subjected individual parts of healthy larger animals, in which no infiltration of bile could have taken place, and which I moreover macerated for several hours in repeatedly renewed water, to this reaction, and soon discovered that it is the so-called protein substances which displayed this red colour in the most beautiful manner, *e.g.*, the muscular fibres; and that, on the other hand, gelatinous textures, from which all albuminous matter had been removed by the previous washing, assumed, instead of the beautiful red, a dirty yellow-reddish colour, or remained, like the pure elastic fibres, perfectly unaltered. Also, on treating thin transverse sections of plants with the above-mentioned substances, those vegetable matters which are analogous to protein substances assumed a bright red colour, whilst the starch and cellulose remained unaltered. It certainly did not escape Will's notice that, besides the secreting and excreting organs of bile, others might also assume the red colour when treated in this manner; and he mentions several instances where this characteristic colour had been imparted, under this treatment, to the muscles of the last abdominal segment of a river carp, which had been dead for twenty-four hours, and also to all the organs of animals kept for a long time in confinement, and even with recently caught animals he has observed the same. Still he ascribes the cause in all these cases to the organs being infiltrated with bile, in consequence of a morbid condition of the animals, produced by confinement, or to their having become impregnated with it during the experi-

ment. A few experiments, however, with single parts of larger healthy animals, which he might moreover have freed, by washing from infiltrated bile, would have shown him that this test is not characteristic for demonstrating the presence of bile.

Pettenkofer (*Ann. der Pharm.*, vol. lii., s. 90) recommends his test only for discovering bile in liquids or paste-like substances, of the latter of which an alcoholic extract is to be prepared. Solid animal substances he had never tried. His method consists in mixing the liquid to be tested with two-thirds of its volume of sulphuric acid, and adding a few drops of a saccharine solution, whereupon, if the quantity of cholic acid present be not too small, a beautiful violet-red colouration appears. At the same ime a heat of more than 50° C. is to be avoided, and the albumen removed by coagulation before the experiment; because *solutions of albumen produce a similar colouration, although only in a very concentrated state, and on being heated with sugar and sulphuric acid.* Pettenkofer adds, "With mucus I never succeeded in obtaining a similar result, nor when the solutions of albumen were but moderately diluted, in which case they always became brown."

But not only solutions of albumen assume this red colour on being treated with sugar and sulphuric acid, and even very intensely so, on diluting the white of an egg with twelve parts of water, and in a temperature of 50—60° C., but also solutions of casein, and particularly of globuline. In common cow's milk and pure casein dissolved in water or sulphuric acid this reaction is very distinct. The colours are exceedingly beautiful and intense if the globuline of the crystalline lens be employed in such a solution as is obtained by bursting the latter in water.

Gelatinous solutions of chondrin or glutin, however, showed no trace of a similar colouration.

The method of Pettenkofer for discovering bile in liquids is, therefore, only applicable in the absence of all protein substances.

But it is entirely impracticable in those cases where Will recommends it, namely, in solid animal textures; for, by this reaction, the presence of even the smallest proportion of protein matter manifests itself by a beautiful red colour, which differs in no respect from that produced by the presence of bile.

Besides protein substances and cholic acid, there is, however, another substance contained in the animal organism, which possesses, in a high degree, the property of producing a violet-red colour, when treated with the above-mentioned tests, and that is olein.

Whilst the solid fats, stearin, margarin, and cholesterine are changed by sugar and sulphuric acid into a brownish greasy substance, the olein globules, when brought in contact with sugar and sulphuric acid, display a change of colour from yellow into red and dark-violet, which yields neither in beauty nor in intensity to that produced by bile. At the same time, the small globules preserve their form and capacity of running together, but do not mix so easily with unaltered olein, so that, if a coloured drop of olein coalesces with an uncoloured one, the new formed drop appears half coloured and half uncoloured, and some time elapses before they mix together. By ether and alcohol, the dark violet-coloured olein becomes almost colourless and dissolved. When the ether and alcohol have evaporated, the olein again separates, first slightly coloured red; and on all traces of the solvents being removed by evaporation, in a somewhat increased temperature, the former beautiful colour returns. That the colouration of olein is caused by some albuminous matter contained in it, is not likely, since olein, purified by repeated solution in ether, became coloured in the same manner.

In order to effect this metamorphosis of the olein with the smallest excess of sugar and sulphuric acid, equal parts of olein and sulphuric acid

are to be mixed in a small cup, and to the yellow viscid mass half a drop of concentrated saccharine solution added to every six drops of the mass.

After the lapse of scarcely a minute, the entire mass will be of the most beautiful violet-red colour. If sulphuric acid and a saccharine solution be employed in great excess, they form a black liquid in which the red oil globules float.

The combination does not long retain its colours in the atmosphere, but becomes almost decolourized by the absorption of water. Protein substances and bile also lose their colour, obtained by this treatment, under the same condition.

Pettenkofer did not succeed in isolating the substance which, in the bile mixed with sugar and sulphuric acid, is the cause of the violet-red colour. From albuminous solutions treated by these substances I was able to represent this peculiar body in the following manner :—The white of fowl's-eggs, diluted with about five parts of water and filtered, was gradually and under constant stirring mixed with as much concentrated and pure sulphuric acid as sufficed to dissolve the precipitate which was at first formed. The liquid was not heated beyond 60° C. To the clear solution, which usually had a reddish tint, a few drops of concentrated cane-sugar solution was added, whereupon, slower at a low temperature but quicker at a higher one, a red colour appeared, gradually becoming deep violet-red. Should the fluid become turbid through the addition of the saccharine solution, or the red colour, at a sufficiently high temperature (about 50°), not readily appear, the addition of a small quantity of sulphuric acid serves both to remove the cloudiness and to produce the colour. After ten or fifteen minutes, during which time the violet-red colour usually attains the highest degree of intensity, ammonia is added to the solution as long as a precipitate continues to be formed. A large excess of ammonia redissolves the produced precipitate, and must, therefore, be avoided.

The violet, flaky precipitate is then filtered from the discoloured solution of sulphate of ammonia, and washed until the water contains no trace of solid substances, does not react upon litmus paper, and is not precipitated by chloride of barium.

This precipitate is dissolved at common temperatures by concentrated sulphuric acid with a purple-red colour, by diluted acid with a violet-red colour. By muriatic acid it becomes violet, by nitric acid yellow, and partially dissolved, like the white of eggs. In caustic potash and ammonia it is readily dissolved. From the ammoniacal solution it is precipitated by chloride of barium, neutral and basic acetate of lead ; but not by lime water, nitrate of silver, and sulphate of copper. The precipitates formed by these salts are dissolved by sulphuric acid, leaving a residue of sulphate of lead and baryta.

These properties, which belong neither to the pure so-called protein substances, nor to the combinations of the same with sulphuric acid, show sufficiently that this body is of a peculiar nature, and elementary analysis will in future discover its composition.

In order to prepare the way for applying to microchemical experiments this property of the so-termed protein substances, namely, of assuming a red colour on being treated with sugar and sulphuric acid, I will now describe the relation in which animal and some vegetable textures stand to the repeatedly-mentioned tests as displayed by the microscope. The tissue to be examined is spread on a small glass plate in a drop of saccharine solution, which must not be too thick, so as is best adapted for microscopic examination, and then 1—2 drops of concentrated sulphuric acid are added, either so that the acid falls immediately on the object, and acts instantaneously and whilst yet in a concentrated state, or, what is in most cases to be preferred, in such a manner that it only touches

the edge of the saccharine solution, and gradually impregnates from thence the whole. If protein substances are present, there appears, in the first case after a few seconds, in the second somewhat later, a beautiful red colour, which gradually becomes violet-red, and which, especially if the preparation has been covered with another glass, lasts for several hours, and then again disappears by the gradual absorption of water from the atmosphere.

If striped muscular fibres, previously macerated for several hours in water, so that the individual bundles of primitive fibres can be easily separated from one another, are treated in the above manner, they become thoroughly red. At the same time, the transverse stripes of somewhat firm muscular flesh, which is not so gelatinized by sulphuric acid as the flesh of the lower animals, becomes apparent in the most distinct manner.

Smooth muscular fibres of the intestines and of the œsophagus, and also the contractile fibres of the arteries, are likewise coloured quite red; the outlines of the single fibres and fibrous cells disappear, however, almost entirely on being brought in contact with sulphuric acid. Also, the nucleus of the same cannot be distinctly perceived.

The substance of the crystalline lens of the eye becomes also as intensely red as the muscular fibres. Its fibrous structure, however, disappears almost entirely on coming in contact with the sulphuric acid.

Also the nerve fibres, the ganglia, and the other elements of the nervous system, are affected in the same manner.

It is, however, different with the gelatinous textures. The fibres of the tendons of the cellular textures and the serous membranes, after having been kept for several hours in water, and freed by repeated washing of all albuminous constituents, become not red, but yellowish brown, whilst they possessed, before being so macerated, a decidedly reddish colour. The elastic fibres, if all the cellular textures have been removed from them by boiling, undergo no alteration. The gelatinous base of the substance of the bones, if cut in thin slices, and repeatedly treated with water, becomes yellowish brown, like the cellular texture, whether the lime salts have been previously removed by diluted muriatic acid or not. The internal integuments of the vascular canals of the bones become, however, intensely red. They consequently contain, like all other vascular coats, protein-yielding textures. The same also in the serous membranes, the vessels which, by repeated exhaustion, have become perfectly discoloured, and scarcely recognizable, present themselves on being treated with sugar and sulphuric acid, in the form of red streaks.

Olein globules of the marrow of bones, which frequently adhere to the interstices of bones, particularly to those of the spongy bones, are also coloured red; the sulphuric acid must, however, touch the olein in a concentrated state, which is not required with textures yielding protein. It therefore frequently happens, on examining textures containing fat, that near the reddened protein substances, colourless olein globules are found, and others, which are red. This does not depend, as might be supposed, upon a difference between the fat globules, but merely on the sulphuric acid not having acted on them in a sufficiently concentrated state.

The relation of cartilage to sugar and sulphuric acid is very peculiar. If, upon a slice of cartilage, that has been kept for some time in water, first sugar, and then sulphuric acid be applied, the peculiar cartilaginous substance becomes yellowish red, whilst the cartilage cells become decidedly red. In order to discover whether this proceeds from a proportion of protein-yielding substances in the latter, I treated a portion of thinly-cut and macerated cartilage with diluted caustic potash, at a temperature of 30—40° C., in order to remove the same; but I could not discover any protein in the potash lye, and the cartilage cells retained also, after having been thus treated, the power of becoming red. It was, however, very

remarkable, that the cartilage, after having been perfectly deprived of the potash, and boiled in water, yielded no chondrin; but a glue which, in its chemical properties, was perfectly analogous to glutin, and also became gelatinised. This observation induced me to perform a number of experiments on the conversion of chondrin into glutin, the results of which may not be quite unimportant for the process of ossification, and which I intend shortly to publish in a separate treatise.

Also the individual cartilage cells, which always remain behind in the preparation of chondrin from cartilage by many hours boiling, assume the red colour.

Blood corpuscles and mucous and pus globules become also beautifully red, and their outlines remain distinctly marked and unaltered, if the acid act slowly. They only swell slightly after having been shrivelled by the sugar. If the sulphuric acid acts in a concentrated state, and quickly, they conglomerate into irregular red balls.

Lastly, we may mention all those parts consisting of so-termed horny matter, which are related to the protein-yielding textures, namely, the epithelium of the serous and mucous membranes, the epidermis, the hair, feathers, horns of cattle, whalebone, and the scales of snakes, as participating in the capacity of becoming red, when treated with sugar and sulphuric acid, particularly if they have been first soaked in potash lye.

The animal substances, peculiar only to lower animals, which are not coloured red by sugar and sulphuric acid, are *chitin*, which forms the fundamental part of the epidermis and tracheæ in insects, crustacea and arachnida, the cellulose of the mantle of ascidia (examined in a specimen kept in spirit of wine), and silk. Neither of the three substances changes its colour, but they are dissolved, if the acid act in a concentrated state. All other soft parts of the lower animals always become intensely red when sugar and sulphuric acid acted upon them.

Having thus refuted Will's opinion, and shown that the capacity of assuming a red colour when treated with sugar and sulphuric acid belongs not only to bile, but also to the so-called protein substances, to horny matter, which is related to them, and also to olein, I shall now only mention the relation of the principal vegetable substances to these tests, as some advantage to vegetable physiology may be derived from their micro-chemical application.

Like the protein-yielding animal substances, the vegetable substances of that character (legumin, vegetable albumen, and gluten) are coloured beautifully red; whilst cellulose, gum, starch, and vegetable mucilage are either not altered at all, or coloured yellowish brown, or dissolved without any change of colour by sugar and sulphuric acid.

Seeds, as is well known, contain an abundance of the so-called protein-yielding substances. If, *e. g.*, a thin slice of a bean or pea be treated with sugar and sulphuric acid, the cellular membranes, provided the acid be not too concentrated, and also the starch appear under the microscope unchanged, the contents of the cells round the starch, however, become intensely red to violet-red, just like the animal protein substances.

If legumin or albumen be isolated from the seeds, it can easily be proved by this reaction, that the red colouration depends on these substances.

That fungi, algæ, and the one-celled siliceous-scaled plants, consist, in a great measure, of protein substance, can also be proved by this test.

Likewise the vegetable fixed oils are, in this respect, analogous to the animal olein, which I found, on examining oil of almonds, poppy oil, olive oil, linseed oil, and hemp oil. The more solid cocoa butter, however, does not assume a red colour. If the fat be enclosed in cells, it does not become red; for, as with the animal olein, the sulphuric acid must act directly upon the fat globules, floating in the saccharine solution, in order to effect the colouration.—*Ann. der Chem. und Pharm.*, lxxi.

CALISAYA BARK.

BY M. H. A. WEDDELL.

THE superiority of Calisaya bark over all the other cinchona barks, dates especially from the important investigations of Pelletier and Caventou ; this superiority having been previously shared by the Loxa bark, which at the present time may be said to be almost valueless. Indeed, this latter scarcely contains anything but cinchonine ; whilst the Calisaya bark contains but a small proportion of this base, yielding as much as from 30 to 35 parts in 1000, that is to say, from 3 to 3½ per cent. of sulphate of quinine. As is the case with most of the cinchona barks, this species is met with in commerce in two forms, which it is necessary to distinguish. These are the *rolled Calisaya*, and the *flat Calisaya*. The first is almost always covered with its peridermis ; the second is generally deprived of it.*

Rolled Calisaya Bark.—Peridermis rather thick, rough, unequal, marked from place to place with annular cracks, and in the intermediate spaces with transverse and longitudinal crevices, which are more or less near to each other, sometimes uniting, and the edges thick and raised ; of a dull silver white or grey colour, or beneath of a blackish brown, tending to a slate colour, with white marbling caused by the cryptograms† which cover it. *Dermis* externally smooth, or more frequently marked with little linear or punctiform impressions, corresponding with the fissures or cracks in the peridermis ; of a rufus colour more or less bright ; the internal surface finely fibrous, of a yellowish rufus colour ; breaking sharply in a transverse direction, with a resinous appearance externally, and slight projection of the fibres beneath.

Flat Calisaya Bark.—Generally consisting merely of the liber, sometimes ten or fifteen millimetres (.39 to .5 of an inch) in thickness, of considerable density, and generally of a perfectly uniform texture. *Exterior surface* irregular, marked with confluent longitudinal furrows, fibrous at the bottom, and uniting ridges of a brownish or yellowish rufus colour, frequently marked with patches of a blackish red. *Internal surface* very closely fibrous, the grain frequently undulated, of a yellowish rufus colour, sometimes with an orange tint, especially if the bark be fresh. *Transverse fracture* purely fibrous, the fibres very short, becoming very easily detached, and penetrating the skin with great facility, causing an irritation which has been compared to that of *Dolichos pruriens*. *Longitudinal fracture*,

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* To avoid confusion, I will here state, that whenever rolled bark is mentioned, I allude to that named by the Cascarilleros *canuto* or *canutillo*—that is to say, the bark of the branches and small trunks, from which, as I have before stated, the peridermis is not removed. By the flat bark, on the contrary, I mean that which the Cascarilleros know by the name of *tabla* or *plancha;* that is to say, those barks which have been artificially deprived of their peridermis at the time of their removal from the tree, and which being produced by large trunks, have been submitted to a greater or less extent of pressure, which has prevented their assuming the hollow cylindrical form of the rolled cinchona. These distinctions, I am aware, are not scientific, and admit of numerous exceptions; as, on the one hand, we frequently see rolled barks without a peridermis, and on the other hand flat barks which retain it. I have nevertheless adopted these distinctions on account of the great facilities they afford in description. I may again mention that I employ the term *peridermis* to indicate that portion of the bark called by the Cascarilleros *enves*; and that, for the sake of brevity, I use the word *dermis* to express all that portion comprised between the peridermis and the wood.

† The cryptograms of the officinal barks have been particularly studied by M. Fée, who has proposed to make them the means of distinction between the different species of cinchona barks. But, however ingenious this mode of distinction may be, I do not think it a good one; because none of these parasites are peculiar to any one species of cinchona; and their existence, which is far from constant, appears to depend more on the nature of the locality than that of the trees on which they are found.

without splinters, the surface covered with brilliant points, owing to the reflection of the light from the denuded fibres ; the colour uniform throughout the bark. *Flavour*, freely bitter, which is gradually developed on mastication, and scarcely astringent.

The variety just described is the most common ; it is known in Bolivia under the following names, *Calisaya amarilla*, *C. dorada*, or *C. anaranjada*. Another variety, remarkable for the dark colour of its surface, which is sometimes of a vinous black, bears the names of *Colisaya zamba*, *C. nigra*, or *C. macha*. I have observed it especially at Apolobamba, in Bolivia, and in the province of Carabaya, in Peru.

Lastly, a third variety, the surface of which is more smooth, sometimes half-cellulose, and of a paler colour, has merited the designation *Calisaya blanca*.

The peridermis acquires, as I have already said, a greater development in this species than in any other. It is not uncommon to find fragments left adhering to the dermis of at least a centimetre in thickness. It will be found that this is formed of several distinct strata resulting from layers which have successively contributed to its formation. Its colour is generally more or less grey on the exterior, and brown within, and it is constantly marked with deep longitudinal and transverse fissures, generally limiting quadrilateral surfaces.

The bark of *Cinchona Josephiana*, or *Ichu Cascarilla* of the Peruvians, has hitherto but rarely been met with in commerce, although it is used, perhaps, as often as any other among the natives, in consequence of the facility with which it is procured. Its peridermis is brown, or of a blackish grey, or slate colour (a colour which, I may observe, appears to be common to all the cinchona barks which are developed under the influence of the wind and sun), upon which the pale lichens which cover it are grouped with much elegance. As this bark adheres strongly to the wood, it is but imperfectly separated, and therefore its internal surface is often broken.

Another kind of bark, furnished by the *Ichu Cascarilla*, was shown me in Peru, which is obtained, not from the trunk or branches, but from the larger roots, or rather from the stumps ; and it is possible that this variety will one day become valuable, notwithstanding that there are some difficulties in the way of collecting it, for not only does it form a mine which has not yet been worked, but it appears also to furnish a product superior to much of that at present employed. This bark is in short pieces, flat, undulated, or more or less contorted, deprived of the peridermis, fibrous or nearly smooth on the inner surface, very slightly cellulose on the exterior, of a uniform ochrous yellow colour, freely bitter, but less so than good Calisaya bark, of which it presents the character in regard of internal structure.

The increasing scarcity of Calisaya bark induces the Cascarilleros constantly to mix the barks of several of their cinchonas, and this fraud is effected much more successfully than it was formerly, and without much experience it is sometimes difficult of detection. The admixture is made especially with the barks of *Cinchona Boliviana* and *Cinchona ovata var. rufinervis ;* or, more rarely, and only on the coast, with the bark of *C. scrobiculata ;* in other words, with the barks which M. Guibourt calls, with much justice, *the light Calisayas of commerce*. With the bark of Scrobiculata it would not be likely to be long confounded, but it may readily be so with the two first ; so much is this the case that in Bolivia the bark of *C. Boliviana* is also called *Calisaya bark*, a name which its properties will, at any rate, justify. The best characters by which to distinguish the true Calisaya from all the other species are, the shortness of the fibres which entirely cover the surface of its transverse fracture, and the facility with which these are detached, instead of remaining

adherent and pliant, as is the case with the *rufinervis* and *scrobiculata*. Lastly, its uniform rufus colour, and its not being marbled throughout its thickness with white, sufficiently distinguishes it from the bark of *C. Boliviana*.

Added to these characters, its great density (which is such that on drawing the nail across its internal surface it produces a bright mark), the depth of the furrows and their projecting edges, are generally sufficient to distinguish the flat Calisaya from all the other barks with which it may be found mixed.

As to the rolled Calisaya, it is much more difficult to distinguish it, for not only does its peridermis, in its physical characters, much resemble that of many other species, especially that of *scrobiculata* and *rufinervis*, but the fracture does not here present such clear characters as it does in the older barks. If even a microscope be used in the examination, the characters are very slight by which it may be recognised; such, for instance, as a slight excess of thickness in the peridermis, and a larger resinous circle, taking into the account, be it understood, the degree of bitterness, which, in doubtful cases, is certainly the most sure method that can be employed to decide the question.‡

For a long time authors of Materia Medica attributed the Calisaya bark to the *Cinchona cordifolia*, misled, no doubt, by the fact of Mutis having called the bark of this tree "yellow bark." M. Guibourt was the first to rectify this error, and guided by the authentic specimens of the barks of Mutis, brought by M. Humboldt, he decided also that it did not owe its origin to *Cinchona lancifolia* of the same author, to which others wished to ascribe it. The true source of Calisaya bark has nevertheless remained in obscurity. Very lately, M. A. Deloudre received from Bolivia specimens of leaves, flowers, and fruits, of different trees which he had reason to believe furnished the bark in question. M. Guibourt, who examined them, hesitated, on such incomplete data, to establish a new species, believing that he recognised in them the characters of plants already known, amongst others, the *Cinchona condaminea*, H. and B., and the *Cinchona lanceolata* and *micrantha*, Ruiz and Pav. The specimens of this collection, which I have had occasion to see, agree with my *Cinchona Josephiana* and *Cinchona Boliviana*. I may add that M. Deloudre had tried to transport into Europe a living tree of the *Cinchona Calisaya*, but this tree died on the road.

In the ports of France the average price of Calisaya bark was for many years from six to eight francs the kilogramme (2lb. 3oz. avoir.). Frequently, however, there have been considerable fluctuations in the price. Thus, recently it has been difficult to obtain it at eighteen or twenty francs the kilogramme, and it has sometimes been, on the other hand, as low as three francs.

Some idea may be formed of the immense consumption of this bark from the fact that the Bolivian Company annually export, free from adulteration, more than 4000 quintals, or 200,000 kilogrammes. It is difficult

‡ Nevertheless, we must not depend too much on this sign when it relates to a thick bark. I have now before me a specimen of Calisaya bark of fifteen millimetres in thickness, which scarcely possesses the bitter flavour of the most inferior barks. This example verifies, to a certain extent, the saying of the ancients, namely, that the virtues of the barks diminished with age. Happily, my example is a rare exception.

I may here make a remark which is applicable to the barks in general;—none of the characteristics are infallible. Those amongst them which would be easily distinguished in a carefully preserved specimen, would no longer be so in one which had been badly prepared, and had been kept for a long time in a damp seron, where it may lose many of its physical characters and many of its virtues. In cases of this sort, no description is sufficient; experience alone, and still better, analysis is the best test of the quality of these products.

to conceive that the forests can long supply such a demand. The quantity of bark afforded by a tree of *Cinchona calisaya* necessarily varies much. One of the most prolific trees may yield from sixty to eighty kilogrammes of dry bark. A tree of ten yards in height, and with a trunk of eight inches in diameter, yields about nine or ten kilogrammes. The Company of La Paz purchase it at an average price of twenty piastres (100 frs.) the arobe, delivered at their depôt; and in the neighbouring province of Carabaya, in Peru, where there is no monopoly, the price is forty piastres. On the coast the price is about double this sum.

ON PIACABA AND COQUILLA NUTS.

BY SIR W. J. HOOKER.

Few have walked the streets of London without remarking that of late years those streets are, in places at least, kept peculiarly neat and clean, by the stiff fibres of a new material for making brushes and brooms; those of the machines, as well as those employed by hand; and if any one is asked what be the origin of this fibre, the frequent reply is, "Whalebone, I suppose." But no; it is not of animal, but vegetable origin, the coarse fibre of a species of palm, which grows abundantly in Brazil, and is imported to Europe extensively from Para, tied up in bundles of several feet in length, and sold at the price of £14 the ton, under the native name of "*Piaçaba*." A reference to our figure (the reduced representation of the palm and leaf-stalks [figs. 1 and 2] copied from Martius' rare and splendid work on Palms), will show what part of the plant affords this curious material, which, according to its stoutness and tenacity, is employed for cordage and mats as well as for brooms and brushes. The dilated base of the leaf-stalks separates into a long coarse fringe, which is collected by the natives and used in the country or exported to Europe for the purposes above mentioned, and now constitutes a considerable article of commerce.

The fruit, or nuts, are another article of commerce, long brought into England under the name of *Coquilla nuts*, and extensively used for various kinds of turnery-work, especially in making the handles of bell-pulls, umbrellas, &c. &c.; for the shell (or putamen, f. 4) is of great thickness, excessively hard, beautifully mottled with dark and light brown, and capable of taking a high degree of polish.

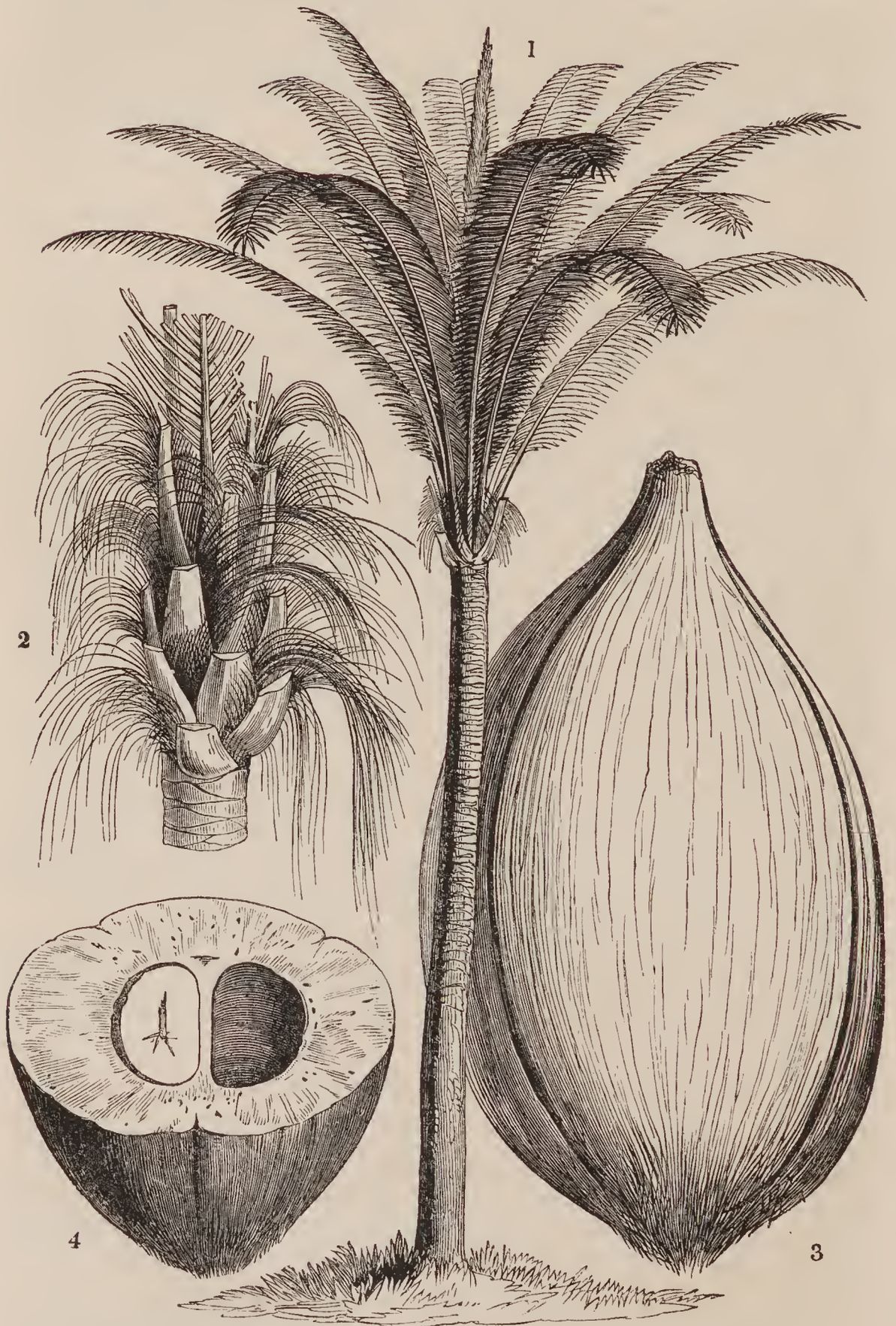
The Royal Gardens possess healthy young palms of this species, but it is rare in our stoves; for, strange to say, some of the plants best known in their products (witness the so-called *African oak*, exported from Sierra Leone, and the so-called *Rice-paper* of China), are least known to botanists, and often do not exist in our living collections. Hence it is that, as above observed, we have had recourse to the plates of Martius for our figures 1 and 2. The genus to which *Attalea* belongs, is of the cocoa-nut group, or division of palms, and, indeed, the fruit was first figured by Gærtner under the name of *Cocos lapidea;* afterwards by Targioni Tozzetti it was called *Lithocarpus cocciformis;* having reference in both cases to the very hard, almost stony nature of the fruit. Martius changed its name to—

"*Attalea funifera;* caudice elato frondibus erectis phalerato, petiolorum basibus fibroso-fissis, drupis ellipticis." *Martius, Palm.* p. 136. t. 95, 96. f. 4. and t. T. f. 1, 2.

The stem or caudex is said to attain a height of from twenty to thirty feet, and the leaves or fronds rise to fifteen or twenty feet above that.

Fig. 1. represents the general appearance of an entire tree of *Attalea funifera*, greatly reduced. 2. Shows the insertion of the leaf-stalks and the filamentose margins of their bases, on a somewhat larger scale. 3. Entire

nut, *nat. size.* 4. Transverse section of the same, showing the thick shell or putamen, and the three cells, of which one or two frequently prove abortive, *nat. size..—Hooker's Journal of Botany.*



Attalea funifera, which yields Piacaba and Coquilla nuts.

ON THE MOMENTARY INCOMBUSTIBILITY OF LIVING ORGANIC TISSUES.

BY PROFESSOR PLUCKER, OF BONN.*

It may perhaps be a matter of interest to you to obtain a confirmation of Boutigny's recent experiment. With his usual kindness, he exhibited to me last Easter his former experiments ; and whilst admiring his rare perseverance in following up a fertile idea, I then acquired an impression that it referred to a law of nature which was by no means completely revealed, and in which opinion I was further strengthened by the report of his last experiment. In consequence of an oral communication of this experiment, M. Fessel wrote to me from Cologne, stating that on the following day he had dipped his finger into lead heated to its highest point, by which means the projecting portion of the nail of the finger had been burnt, but in other respects the finger remained perfectly uninjured ; he also stated further, that a workman in the employ of Messrs. Behren and Co., manufacturing engineers at Cologne, had made the experiment with melted iron, and would repeat it before me. I therefore accepted the offer and, accompanied by several persons interested in the matter, proceeded to Cologne. The workman in my presence struck the unmoistened extremities of his fingers rapidly and not without fear against the surface of the iron, which had just flowed from the melting furnace into a trough, and which was afterwards used in casting a large plate for a furnace. I was thus convinced of the perfect truth of Boutigny's experiment ; and whilst carefully examining the extremities of the workman's fingers, one of the two assistants of the Physical Cabinet, accompanying me, struck the entire surface of the open hand, which he had previously dipped in water, so strongly against the bright red surface of the iron, that some of the fused metal was ejected ; the other assistant immediately afterwards also struck it with his moistened hand. After these experiments, which were made in opposition to Boutigny's precautions not to strike the mass, experiments, which for the sake of precaution I wished to make before the immersion, became unnecessary ; I moistened my right hand, inserted the index finger almost completely into the melted mass, and moving it very slowly through it, withdrew it in two seconds : at the same time I felt how the iron moved before my finger, but did not experience the slightest sensation of heat.†

I should have considered the temperature of the iron, which was about 2732° Fah., as below 96° Fah.; for on withdrawing the finger, it was not so warm as the other hand. M. Fessel also, and the other three persons who accompanied me, repeated this experiment with certain modifications : one of them with his hand dry; another remarked that the hand, after having been previously dipped in water, when withdrawn was only dry in that part which had not been immersed ; a third took up the iron with the hand made hollow. The minute hairs upon the inserted fingers had entirely disappeared ; but the nails were not injured, nor was any penetration of heat through the nails remarked. The hand when withdrawn had a slight empyreumatic odour, which was stronger when there were warts upon it ; but in no case was there the slightest burning sensation, or even a disagreeable sensation of heat. Hence certain minor

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* From Poggendorff's *Annalen*, Dec. 7, 1849.

† More than twenty years ago Professor H. Rose, in visiting the foundries at Avestad, in Sweden, saw a workman, for a small reward, take melted copper with the bare hand from a crucible and throw it against the wall. This confirms his statement, as also some other facts which Boutigny himself mentions in his memoir, that the phænomenon mentioned has long been known, especially among people engaged in the arts.—*Poggendorff.*

operations in surgery might be performed with least pain by placing the foot in a bath of red-hot iron. Lastly, I made one other experiment, the result of which has been anticipated.

I held the finger of a leathern glove, which I had well wetted inside and placed on a wooden rod, for nearly a minute in the melted iron ; on withdrawing it, the glove was not only unburnt, but had only a temperature of about 132° Fah. (I had not a thermometer with me). Conjectures and theoretical views upon these remarkable phenomena would be premature without further experiments. I hope, however, soon to be able to communicate some remarks upon them.—*Philosophical Magazine.*

ON THE TOXICOLOGICAL PROPERTIES OF SULPHATE OF LEAD.

Dr. Pleischl was led to investigate the degree of solubility of sulphate of lead, from the occurrence of several instances of poisoning by the salts of lead, dissolved out of the glazing of common earthenware culinary vessels by the acids of the alimentary substances which had been prepared in them. The rarity of this form of poisoning has been attributed to the decomposition of these soluble salts of lead by the sulphuric and phosphoric acids in alimentary substances within the stomach, and their consequent conversion into the insoluble sulphate. Dr. Pleischl quotes the authority of Liebig that sulphate of lead is an insoluble, or nearly insoluble, heavy white powder. He cites, on the other hand, the statement of Bischoff, that the sulphate of lead is sparingly soluble in nitric acid, in nitrate and acetate of ammonia, and perfectly soluble in strong hydrochloric acid, even in the cold ; from which, however, it is again thrown down on dilution with distilled water. Berzelius also observed that the sulphate is soluble in concentrated muriatic acid, and that the solution deposited on cooling crystals of chloride of lead.

According to Bischoff, nitric acid will dissolve a small proportion of sulphate of lead ; viz. one part in a hundred and seventy-two, at the temperature of 12° R. = 57° F., and with a specific gravity of 1.144. A solution of nitrate of ammonia, sp. gr. 1.29, will dissolve one part in nine hundred and sixty-nine ; and a solution of acetate of ammonia, of sp. gr. 1.036, will dissolve one part in forty-seven. The solvent power of the last-named salt may be made available to separate sulphate of lead from other combinations. Sulphate of lead is soluble in cold solution of sal ammoniac.

These facts controvert the before-mentioned explanation. But it remained to ascertain, by direct experiment, whether sulphate of lead was capable of solution by the acids ordinarily met with in culinary processes at common temperatures. With this view sulphate of lead was subjected to the action of the following acids, the mixture being frequently stirred during twenty-four hours, then filtered through paper previously washed in dilute nitric acid :

1. Acetic acid. Hydrosulphuric acid threw down at first a brownish, then a black precipitate of sulphuret of lead. From the clear liquid which remained, the muriate of baryta threw down white sulphate of baryta, showing that the acetic acid had contained sulphate of lead in solution.

2. Acetate of soda. Hydrosulphuric acid threw down a brownish-black precipitate ; hydrosulphate of ammonia a still blacker precipitate. After a few days, carbonate of ammonia threw down an abundant white precipitate, as did also barytic salts.

It has been already pointed out that muriate of ammonia forms a soluble combination with sulphate of lead. A similar property in acetate of soda is now for the first time made known. In this chemical combination there

is either a mutual decomposition, a simple interchange of elements, or a soluble ternary compound is formed.

3. Diluted hydrocyanic acid (one part to two of water). Hydrosulphate of ammonia produced the black precipitate. The excess of hydrosulphuric acid being driven off, and the muriatic acid neutralized by carbonate of ammonia, on again adding hydrosulphate of ammonia, a still more abundant black precipitate was thrown down.

4. With a saturated solution of tartaric acid, the same results were exhibited.

5. With a strong solution of citric acid, the like effects followed the use of the same tests.

In these two last acids the effects were less marked than with acetic acid.—*Oesterreichische medicinische Jahrbücher, and London Medical Gazette.*

[The solubility of sulphate of lead in different liquids is, on several accounts, an interesting object of inquiry.

Orfila, even in the last edition of his *Traité de Toxicologie*, published in 1843, declares the sulphate to be insoluble and inert ; and, therefore, that the sulphate of magnesia is a true antidote or counter-poison for the acetate of lead. But five years ago Mialhe, in a *Mémoire sur les Emanations du Plomb et l'Absorption des Médicaments*, stated that sulphate of lead is decomposed by the alkaline chlorides (common salt, for example), contained in the animal fluids, and converted into chloride of lead (PbO, $SO_3 \times NaCl = PbCl \times NaO$, SO_3), which being soluble is capable of becoming absorbed and of acting injuriously on the system. Mialhe also stated that sulphate of lead was soluble in the alkaline acetates, as acetate of ammonia.

It is probable that those salts which decompose sulphate of lead and give rise to a soluble salt of lead, would likewise decompose *sulphite* of lead. If this be the case, the efficacy of sulphurous acid in removing every trace of lead from saccharine solutions may be suspected ; and the danger of using sugar refined by the patent processes of Mr. Sievier and Dr. Scoffern (noticed in our November number) is sufficiently obvious.—Ed. Phar. Journal.]

ON SALEP.

BY DR. X. LANDERER.

The enormous quantities of salep root which are every year brought from Macedonia, chiefly from about Janina to Greece and the whole of the East, induced me to obtain some information respecting this important substance.

In all parts of the kingdom of Greece, but particularly in the plains between Nauplia and Argos, in Messenia, many sorts of orchis are found, and amongst these, *Orchis pyramidalis*, on hills in Messenia and Lukonia ; *Orchis mascula* on the Parnassus, in Arcadia, in Argolis ; *Orchis longiflora* and *O. variegata* in all parts of Morea ; *O. undulatifolia* in Messenia ; *O. sambucina* in Elis ; *O. nigra*, *O. maculata*, *O. conopsea*, in the islands, &c.

From all these species the tubers are carefully collected, but on account of their disagreeable smell and the mucilaginous and unpleasant taste of the decoction, they are very little used, so that only the poorest class of inhabitants gather and employ them for domestic purposes. The Grecian salep is not an article of commerce. Commercial salep comes from Macedonia, from the fruitful valleys and the evergreen mountains about Janina, from Sagona, Tempe, &c.

The species of orchis found in these parts of Epirus, are *O. pyramidalis*, *O. mascula*,, and *O. Morio*.. Without the least attention and care having

been paid to the culture of these plants, extensive tracts of land and mountains are seen at the commencement of the spring, in the months of February, March, and April, covered to the top with orchis plants. This luxuriance is said to be principally caused by the annual digging up of the soil. The more severe the winter has been, and the snow has covered the mountains during the winter months, the more abundant is the salep crop; it is also stated to have been observed that a larger consumption of the salep root is followed by a larger produce of it, as the people are thus compelled to turn up the soil, by which the development of the small tubers is much promoted.

After the inflorescence, namely, in April and May, the crop begins, and lasts till August. For this purpose, the soil is turned up to the tops of the mountains, the tubers picked out, and the ground again made flat. The tubers are now repeatedly washed in a running water, and the smaller separated from the larger ones. The first are strung on thread by women and children, and quickly dried in the sun. The tubers which come from these parts to Greece, are scarcely as large as a pea, and are generally of a much darker colour than those not strung upon thread, which are sold for double the price. These latter are said to retain their white colour by being quickly dried in a baking oven, by which they acquire a horny character, which is imparted to them by merely quick drying, and not, as stated in pharmaceutical works, by being previously dipped in boiling water. Whether this immersion is customary in Persia or not, I cannot say with certainty, the *Saleptsides* in Constantinople, who import their salep from Persia, do not mention anything of the kind.

Some roots possess a somewhat saline taste, which proceeds, however, not from their having been dipped in salt-water or sea-water, but from the soil where they grow, for the various sorts of orchis thrive very well on the coast. The salep imported from Persia, which is sold in the bazaars of Smyrna and Constantinople, and which is at the same time distinguished for its whiteness and corneous appearance, is particularly said to have a very saline taste. In the East, however, where the consumption is greatest, this sort is not liked, and, therefore, the Macedonian kind is preferred.

The collectors pay particular attention to those plants with blue blosoms, as they consider the root to be "the male salep," which, in their opinion, possesses a greater medicinal power, and is, on this account, sold much dearer. When the bulbs are perfectly dry, they are placed in sacks, and sent to the East for sale.

The salep is in great reputation among the Turks as a strengthening medicine, and is used throughout Greece in affections of the bowels and respiratory organs. The decoction of salep, or rather the gelatine salep, is prepared in the following manner by persons who are called in Greece and in the whole of the East, *Saleptsides*:—

The salep is ground by means of handmills into a fine powder, then stirred up with water, and boiled into a stiff jelly, which is sweetened with honey. Some Saleptsides add also a small quantity of cypress root, in order to make it slightly acrid.

After midnight these men go to work, and with day-break they are heard crying "*Salep! Salep seston!*" *i.e.* hot salep, which is taken against cough, &c., not only by the poor, but also by others. The salep jelly is carried about in large tin vessels, and kept hot by coals underneath. About eight o'clock in the morning the whole troop of these Saleptsides disappear all at once, and betake themselves to their huts in order to issue again from thence with the following daybreak.

ON CANTHARIDIN, AND ITS PHARMACEUTICAL PREPARATIONS.

BY DR. OETTINGER.

In 1841 I expressed my opinion that cantharidin is the only constituent contained in the cantharides which possesses blistering power, that the cantharides in substance are, therefore, not all required for blistering, and that a cantharidin taffeta not only fully supplies the place of the Spanish flies, but is even preferable to them.—(*Jahrb. d. ärztl. Ver. in München* III. Jahrg. 1841.) At that time I published a method of preparing a vesicating taffeta, which answered all the technical and dynamical purposes of a blister, and which has been practically substantiated in thousands of cases. The usefulness of this remedy soon manifested itself in Germany by its universal application, but still more by the attempts of apparently improving upon my method of preparation. The proposal of spreading the mass upon paper instead of taffetas, was considered by many not only an essential improvement, but even as a sufficient claim for obtaining a patent.

In the year 1847 I was induced to read to the Medical Society in Munich (*vide* Med. Corresp. Bl. bayer. Aerzte, 1847, p. 813), and a year afterwards to publish, an account of my experience of this preparation during nine years, and to show that it is perfectly indifferent with regard to the effect, whether the cantharidin be employed in a pure state, or mixed with the green and waxy resin; and whether it be spread on taffetas, linen, or paper. At the same time I also minutely explained its physiological and therapeutical effect.

In this paper I shall give an account of a solution of cantharidin which serves as the basis of various blistering preparations, and also describe a new vesicating substance containing cantharidin, namely, the *collodium cantharidale.*

Cantharides when treated with ether, yield the *oleum cantharidum viride*—consisting of cantharidin, green oil, and waxy resin; the first, by the separation of the two latter substances, becomes pure cantharidin. This operation, however, is tedious and expensive, and is attended with a considerable loss of active matter, without an augmentation of the blistering power, but with a great increase of price. We employ, therefore, for the purpose of blistering, the *ol. canth. vir.*, which is obtained most easily and in the greatest abundance by means of ether. This extract readily combines with resins, fat, and collodium, and may be admitted into the Materia Medica under the denomination of *æther cantharidalis seu vesicans.* If applied twice without any admixture, by means of a hair pencil, it produces in children after one or two hours, and if three times applied in adults in three to four hours, abundant blisters, which are treated in the same way as those produced by the ordinary blistering plaster. The ether evaporates speedily after the application, and the remaining fixed *oleum cantharidum viride* operates like the cantharides in substance.

The *æther cantharidalis*, combined with turpentine and resin and spread upon taffetas, linen, or paper, forms respectively—the *tela sericea* (taffetas), the *linteum*, or the *charta vesicans seu cantharidalis*—mixed with fat, the *unguentum cantharidale seu vesicans*—and with collodium, the *collodium cantharidale seu vesicans.* It serves, therefore, as the substratum for all preparations containing cantharidin.

Preparation of the æther cantharidalis.

℞ Cantharid. rudit. pulv.....part. unam.
Æther. sulphuric. .....partes duas.
Digere per tres dies et exprime.

In somewhat larger quantity the ol. canth. vir. is obtained by employing

Real's press, or the displacement apparatus (as Ostermeyer does here), or Mohr's apparatus. The preparations composed of *æther canthar.* obtain according to the addition of excipients a different form, namely:

1. *Taffeta vel charta vesicans s. cantharidalis.*

Taffetas (marceline), stretched on a frame, or paper on a board, is to be painted over twice at proper intervals with an aqueous solution of isinglass; when perfectly dry the liquor cantharidalis—prepared in the following manner, is to be spread over it:

℞ Æther. cantharidalis.
Æther. sulphur. aa. ℥j.
Terebenth coct.
Colophon, aa ʒji.
Misce et solve.

A painter's brush, moderately moistened with the solution and softly pressed against the brim of the vessel, is then passed at short intervals, and always in the same direction, twice over the stretched material—in twenty-four hours once more—and again after twenty-four hours for the fourth time. In order to prevent the agglutination of the preparation, it is coated after a few days with a fresh solution of isinglass that has already commenced to congeal. The taffeta and the paper are equal to one another in effect, only that the latter is cheaper by a fourth. Before applying the plaster it should be wiped with a wet rag in order to remove the last applied coating of isinglass.

2. *Unguentum vesicans s. cantharidale.*

This ointment, prepared after the Prussian pharmacopœia, is, as I have before stated, indispensable in the treatment of children. After three or four applications it produces within three or four hours abundant blisters, which entirely disappear in a few days. If prepared with equal parts of *æther cantharidalis* and fat, it operates after two or three applications within two hours equally intensely, but quicker and more sure. Half a scruple of *æther cantharidalis* and the same quantity of hogs' lard are sufficient for a threefold application upon a surface as large as a crown-piece.

3. *Collodium vesicans seu cantharidale.*

Æther cantharidalis and gun-cotton in substance or solution (collodium) offer a very remarkable vesicant. The ol. cantharid. operates as blister, and the ether rapidly evaporating, the collodium dries within a few moments and forms a coating.

The formula given by Dr. Ilisch in St. Petersburg, the inventor of the collodium cantharidale, has already appeared in the *Pharmaceutical Journal*, for September, 1849. Its efficacy has been proved by repeated experiments made by Balbiani and Basse.—(*Pharmac. Central Blatt*, 1849, No. 7).

These statements I must correct in so far, that by the above-mentioned operation a saturated solution of cantharidin in ether with green oil, and waxy resin—*viz.*, the *ol. cantharidum viride*, is obtained, and not of cantharides; there is also no use in employing acetic ether since sulphuric ether fully answers the purpose.

Dr. Rapp, who first introduced the collodium cantharidale into Germany, expresses himself in the following manner: "Recently medicinal substances have been combined with collodium for endermic application. This object can only be obtained by volatile substances, which combine with collodium, and readily dry, but which notwithstanding their volatile nature, are still absorbed under the coating of collodium and act upon the epidermis. Such a substance is cantharidin; this liquid thinly applied with a brush upon any part of the body, dries in a few seconds, and protects this part with a coating like goldbeaters' skin. The skin surrounding the periphery of the painted place reddens in children within

two or three hours, with adults within five or six hours, accompanied by a burning sensation; gradually the coating, consisting of collodium, rises, and after a few hours a blister is formed, which extends a few lines beyond the whole periphery. On this part, which was not covered with collodium, the blister is opened; the collodium coating which cannot be removed, remains in its place, and thus protects the sore place, dispensing with the use of ointment." This practical communication of Dr. Rapp deserves to be universally acknowledged.

Æther cantharidalis, prepared after my prescription, is a suitable constituent of all preparations of cantharidin, and is perfectly adapted for preparing the *collodium cantharidalis*. Instead of dissolving gun-cotton in it, I prefer a mixture of equal parts of *æther cantharidalis* and collodium, and rather apply it twice instead of once on the place to be blistered. Since the publication of Rapp's method, I employed it, prepared after my prescription, in about twelve cases with the best effect. Two scruples of this *collodium cantharidalis* were generally equal to four drachms of the common blistering plaster.

The reason why I have modified Ilisch's method of preparing it, is that his preparation is too strong for children, and that the quantity of cantharidin contained in it can neither be increased or diminished, whilst, according to my prescription, the collodium can be added at discretion; and for children I actually took only one part of *æther cantharidalis*, and two parts collodium. Finally, I consider my method preferable with regard to technical purposes; *æther cantharidalis* and collodium are always ready, and the whole does not require to be purposely prepared, and on depending parts of the body the *collodium cantharidale* flows down before it has become dry, and does, therefore, not supply, in this case, the place of taffeta vesicans.

ON THE ALCOHATE AND NITRATES OF MAGNESIA.

BY A. CHODNEW.

In the year 1827, Professor Graham drew the attention of Chemists to a remarkable group of compounds which, on account of their analogy with the hydrates, he called *alcohates*. According to his opinion, absolute alcohol possessed the capacity of forming, with some anhydrous salts, combinations, in which the alcohol supplied the place of the water of crystallization; and although the idea of replacement of water by alcohol, equivalent for equivalent, is not combined with the term *alcohate*, still it may be considered as the most suitable for these compounds, in the examination of which I came to the following conclusions:—

(1.) The hexhydrated nitrate of magnesia does not crystallize, as Einbrodt says, in very long parallelopipeds with a strictly square base; but forms, as has been known for some time, rhombic prisms, among which, as I have convinced myself, other derived crystalline forms of the one-and-one-axial system are met with.

(2.) The hexhydrated nitrate of magnesia is, contrary to Einbrodt's statements, a very deliquescent salt.

(3.) The monohydrated nitrate of magnesia is easily formed, as has already been proved by Graham, and the contrary opinion of Einbrodt is thus refuted.

(4.) The formation of anhydrous nitrate of magnesia is likewise not difficult, although it cannot be obtained without adding some basic salt. This circumstance is, however, not prejudicial to the formation of the alcohate of the nitrate of magnesia. The existence of the anhydrous salt was consequently rejected by Einbrodt without any reason.

(5.) Over sulphuric acid the hexhydrated nitrate of magnesia loses four atoms of water, and the bihydrated salt ultimately remains.

(6.) If the anhydrous nitrate of magnesia be decomposed by heat, a triple basic salt is first formed, which is ultimately decomposed into nitric acid (nitrous acid and oxygen) and magnesia.

(7.) The old opinion of Foureroy concerning the existence of the double salt of nitrate of magnesia and nitrate of ammonia, must be given up.

(8.) Anhydrous nitrate of magnesia forms with alcohol a combination, an alcohate, which consists of three atoms of alcohol and one atom of anhydrous nitrate of magnesia. It is very likely that there exists also a compound of nitrate of magnesia, alcohol, and water.

(9.) Anhydrous chloride of calcium, dissolved in nearly perfectly anhydrous alcohol, forms an alcohate, which is composed of two atoms of alcohol and one atom of chloride of calcium. With great probability it may also be presumed that there exists another alcohate of the chloride of calcium, consisting of three atoms of the chloride of calcium, two atoms of alcohol, and two atoms of water ; consequently,

(10.) The compounds discovered by Graham, and denominated by him *alcohates*, are not mechanical mixtures but real chemical compounds. It is indeed true that he has given no explicit analysis of them, and thus afforded room for doubting the correctness of their composition, but it was no reason why the existence of these interesting compounds should have been denied, without a single experiment being made to examine the truth of Professor Graham's statements.—*Ann. der Chem. und Pharm.*, lxxi.

THE TEMPERATURE AT WHICH GUN-COTTON EXPLODES.

Gun-cotton explodes at 62°5 C. On the average, however, at 93.6° C. if within five minutes it be brought from the common temperature 20° C. to the latter. Furthermore, whilst slowly decomposing at a temperature of 55° C., it does not explode if it be so slowly heated that the temperature increases within each minute by 3°, at the same time losing much in force during the process of decomposition. These facts are very important for the transport of gun-cotton, since as metal can, in the sun, be easily heated to 62°, and in from two to five minutes ignite it.

IMPROVED PROCESS FOR MANUFACTURING WHITE LEAD.

BY MR. J. E. D. RODGERS.

Patent dated August 1st, 1849.

Mr. Rodgers proposes to manufacture carbonate of lead, commonly called white lead, by suspending pieces of sheet or cast lead, bent in the form of two sides of a triangle, upon frames erected in a room, or chamber, which is capable of being darkened, and rendered air-tight, or nearly so, when required. Underneath the frames are troughs, some of which are filled with a fluid capable of passing into the state of vinous fermentation spontaneously, or of doing so on the addition of yeast, and thereby evolving carbonic acid gas. The other troughs contain sour beer, vinegar, or other similar fluids, into which steam-pipes from a boiler are caused to open, so as to produce acetic acid, or pyroligneous acid and aqueous vapours. The *modus operandi* is as follows :—The pieces of lead are suspended in the frames as close together as possible without actual contact, and the chamber made air tight, or nearly so, and maintained at a temperature of from 70° to 80° Fahr. As soon as the carbonic acid gas is evolved, the chamber is darkened, and steam admitted about three times in every twenty-four hours, to produce acetic, or pyroligneous acid and aqueous vapours.

The chamber is provided with a manhole, to allow of the troughs being replenished when the fluid contents have been exhausted, which will occur at the expiration of forty-eight hours. This operation for converting metallic lead into carbonate of lead generally takes twelve days.

Claims.—1. The use of a chamber or room, in the manufacture of white lead, which is capable of being made air-tight, or nearly so, when required, and into which the supply of carbonic acid gas, and acetic acid, or pyroligneous acid and aqueous vapours, may be controlled or regulated.

2. The introduction of steam into the converting chamber, either alone or combined, as described.

ON THE REACTION OF BORAX ON TINCTURE OF TURMERIC.

BY DR. VOGEL, JUN.

Vogel gives the following directions for distinguishing the alkaline reaction on tincture of turmeric from that of boracic acid on this colouring matter:—

Dilute the tincture with water so as to form a pale yellow liquid. Then mix with it a concentrated solution of borax, by which the liquor is coloured brown from the alkaline nature of the salt. If a few drops of sulphuric acid be now added the yellow colour of the liquid is restored; but the further addition of sulphuric acid causes the yellow colour to become reddish-brown owing to some boracic acid being set free. More sulphuric acid being added produces no change in this reddish-brown colour.—Buchner's *Repertorium*, 3tte Reihe, Bd. iii., Heft. 2.

IMPROVED PROCESS FOR OBTAINING CARBURETTED HYDROGEN GAS, AND FOR APPLYING THE PRODUCTS TO VARIOUS USEFUL PURPOSES.

BY M. F. J. DE CAVAILLON.

Patent dated August 1st, 1849.

The patentee remarks, that the ordinary carburetted hydrogen gas has hitherto been manufactured from coal alone; but, that he proposes to mix with the coal, in the proportion of fifty per cent., bones, suet, oleaginous seeds, spent bark, and sawdust which has been used in the purification of oils, or any fatty or oily waste. These substances are moistened with molasses or empyreumatic oil, and mixed with the coal; after which the whole is shovelled into ordinary gas retorts, and distilled in the usual way.

The resulting products are stated to be—

1. Carburetted hydrogen gas, of a highly-illuminating power.
2. Animal charcoal.
3. Animal and vegetable charcoal, in powder, which may be applied to the preparation of manure.
4. Empyreumatic oil.
5. Rich ammoniacal liquors.

In order to economise the lime employed in the purification of gas, it is proposed to employ a purifying powder, composed of one half of any of the natural or artificial sulphates of lime (by preference, plaster which has been used in building), animal charcoal, vegetable charcoal, coke, river or sea sand, spent bark, sawdust, peat, or turf, sulphate and oxide of lead, all reduced to powder, and wetted with dilute sulphuric acid, or acidulated water of 6° to 7° Beaumé. The gas to be purified is made to pass through perforated metal plates, or wire gauze shelves, upon which is laid moss, to prevent the apertures being clogged by the refining powder which is laid thereon. The lime is laid above the powder. The quantity of lime

employed is one-third, and that of the refining powder two-thirds ; which last is composed of purifying substances, such as the sulphates of lime, inert substances rendered purifying, such as sawdust saturated with sulphuric acid, and inert substances, such as powdered coke. When the materials are charged with too much ammonia or sulphuretted hydrogen (which can be ascertained by causing the gas to come in contact with turmeric test paper, and paper saturated with acetate of lead, which will be turned black), they are to be replaced by a fresh supply of refining powder and lime.

ROYAL INSTITUTION.

ELECTRICITY OF THE AIR.

On Friday, February 1st, Professor Faraday described the results of the recent investigations of Peltier and Quetelet on the above subject. He explained the method hitherto generally adopted for ascertaining the electrical condition of the atmosphere, by using a long pointed rod, in connection with an electrometer ; and stated that no satisfactory results could be obtained by such means. Peltier had adopted quite a different method, which was much more accurate. He employed a very delicate electrometer, the action of which was indicated by the deflection of a very small magnetic needle ; and this was surmounted by a metallic ball, which was electrified by induction. With this apparatus, the electrical condition of any stratum of air could be determined with relation to the earth, by raising the apparatus into the space to be examined, uninsulating the ball, and then bringing the electrometer to the earth again, and observing the amount of deflection of the needle. The first important result obtained by Peltier with this apparatus was, that the electricity of the air at any one period is the same at equal altitudes from the earth, no difference being indicated on moving the apparatus in horizontal directions, although marked differences are found in the strata above or below. In making these experiments, it is important that the instrument should be placed on some building which is higher than all surrounding objects. Another very interesting fact, established by Peltier, from five years, observation, is that the air is much more highly electrical in the winter than in the summer. The following table indicates, by the numbers, the relative electrical conditions of the air in each month of the year:—

January	605	July	40
February	578	August	62
March	200	September	70
April	141	October	131
May	84	November	209
June	47	December	507

It had also been observed, that the sky is more highly electrical in clear than in cloudy weather, as indicated in the following table:—

	Cloudy.	Clear.		Cloudy.	Clear.
January	268	1133	July	41	35
February	220	493	August	56	64
March	129	261	September	42	78
April	71	149	October	75	168
May	46	63	November	109	226
June	36	37	December	181	571

There was found to be a difference in the electricity of the air during fog, snow, and rain, as indicated by the following numbers :—

Fog..... 54 | Snow ..... 64 | Rain 35

TO CORRESPONDENTS.

J. J. W. (Tonbridge).—Distillation is the process usually adopted for separating alcohol from a mixture; sometimes, however, its separation is effected by the addition of carbonate of potash. The identity of the alcohol is determined by its physical characters, and by its conversion into ether.

A. B. (1.) The most conclusive test for salicine, in addition to its physical characters, would be its conversion into the hydruret of salicyle, a fragrant oily substance, identical with oil of meadow-sweet.—(2.) In the apparatus alluded to the two tubes are used as described, in order to admit of the two parts of the apparatus being readily united or disconnected.

Xyster.—There is no authorised formula published for Battley's Liquor Opii Sed.

Junius.—Several methods have been suggested, besides that of Mr. Drayton, for precipitating silver from its solution on to the surface of glass. A process is described in a recent number of this Journal, in which this is effected with a solution of gun-cotton. Grape-sugar, aldehyde, and other bodies may also be employed for the same purpose.

An Inquirer.—(1.) Has furnished an account of a disease which affects those who prepare the arsenical compound for dipping sheep. His letter not being authenticated with his name nor address, we cannot publish it.—(2.) The electro-magnetic machine is that which is now most frequently employed in the application of electricity for medical purposes. The single current machine is by many considered the best. An apparatus of this kind is noticed in our last number, page 349.—(3.) Dr. Golding Bird's *Lectures on Electricity*, recently published.

W. C. (York), will find the formulæ for Lugol's solutions of iodine in Gray's *Supplement*, under the head of *Balneum Ioduretum*, the solutions having been prescribed for the preparation of baths.

Lateo.—The discrepancies alluded to, with reference to the latent heat of steam, have arisen from the circumstance that different experimenters have obtained results which do not exactly coincide. The most recent investigations on the subject are those made a few years age by Regnault, an account of which is given in the first volume of the works of the Cavendish Society. He estimated the latent heat of steam of 212° temperature at 998.60°, and this result is now adopted as that on which most reliance can be placed.

Aikhran (Bath.)—*Prepared cochineal* for colouring jellies, &c.

Take of—Cochineal,
Salt of Tartar,
Cream of Tartar,
Alum, āā, ℥j.
Distilled water, ℥viij.

Boil the cochineal and salt of tartar in the water, then add the cream of tartar and alum, and strain.

Enquirer.—(1.) The lectures are not published, but most of the matter will be found in Dr. Roget's work on electricity and magnetism. The new matter relating to magnetism will be found in Professor Faraday's papers, read before the Royal Society.—(2.) Griffin, 53, Baker Street.

M. P. S. (Gloucester.)—(1.) See Mr. Rogers's paper on amalgams, page 402.—(2.) We cannot recommend any better method of reducing asbestos to powder than to heat it to redness, plunge it into cold water, dry it, and pound it in a mortar.—(3.) Calcined gypsum.

Carlisle.—(1.) *Extract of Indian Hemp* is made by macerating the plant in rectified spirit, and evaporating.—(2.) *Tincture of Indian Hemp* is made by dissolving 24 grains of the above extract in f℥j of rectified spirit.—(3.) *Donovan's Solution of Hydriodate of Arsenic and Mercury*, see vol. ii., page 469.

Ignoramus.—(1.) There is no general law on the subject.—(2.) See vol. vii., page 95, and vol. iii., pages 94, 143, 192, and 341.

W. E. P.—Silk, with common amalgam.

J. B. H.—By the taste.

Amator (Norwich).—No.

F. R. (Norwich).—The precipitate is caused by the gallic and tannic acids in the infusion. See vol. i., page 556.

M.—(1.) Recommends the application of honey, after washing the hands, as a remedy for chilblains, in preference to the concentrated tincture of capsicum.—(2.) The labels do not come within the provisions of the stamp act.

An Associate P. S.—Some of the distilled waters of the Pharmacopœia are not clear, and cannot be made so, without abstracting the chief portion of the oil.—See vol. iv., page 558.

W. H. B. (Maidstone).—See *Selecta e Prescriptis*, reviewed vol. vii., page 502.

A Beginner (Salisbury).—Fownes's *Manual of Chemistry.*

X. Y. Z. (Westbury).—We have not seen Beasley's *General Druggists' Receipt Book.*

Scrupulus (Mold).—We have never seen any work expressly on aërated waters. Probably Dr. Granville's *Spas of Germany* would give the information required.

A Registered Apprentice (Leeds).—The back numbers of the *Pharmaceutical Journal* may be obtained through any Bookseller who will take the trouble to order them from the Publisher.

G. R. G.—Lindley's *School Botany* and Lindley's *Elements of Botany.*

T. J. R. (Hull).—We cannot recommend any work on the subject.

We have to acknowledge the receipt of Mr. Fewtrell's communication, which is deferred.

Mr. John Astley, of Shrewsbury, gives the following formula for INCENSE: ℞ Styracis. Calam., ℥iiss.—Gum Benzoin, ℥xij.—Mosch. gran., gr. xv.—Sacchari. Ust., ℥ss.—Gum. Thuris, ℥iiss.—Gum. Tragac., ℥iss.—Aq. Rosæ q. s. To be made into a mass and divided into small tablets.

Mr. Astley also gives a modified formula for a hair lotion, alluded to in our number for December.

ORIGINAL.	MODIFIED.
℞ Ol. Macis. exp., ℥ss.	℞ Ol. Macis. exp., ℥ss.
Ol. Olivæ, ℥ii.	Ol. Olivæ, ℥ii.
Liq. Ammon., ℥ii.	Ol. Rosmarin. ess. gtt. iv.
Sp. Rosmarin., ℥j.	Liq. Ammon. s. carb., ℥ij.
Aq. Rosæ, ℥iiss. M.	Aq. Rosæ, ℥iii. ℥ii.
	Sp. Vini, R. ℥ii. M.

Carefully incorporate the oils, then add gradually the waters, constantly agitating—lastly, add the spirit. Although we insert the above it must not be understood that we justify so material a deviation from a prescription when brought to be dispensed.

A Correspondent directed our attention to a case "important to the profession," about to be tried at the Guildhall County Court. On inquiry we were unable to discover to what case he alluded.

ERRATUM.—Vol. ix., page 349, 25th line from the bottom, *for* "aspersa," *read* "aspera."

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the EDITOR, 338, Oxford Street, before the 20th of the month (if Answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. IX.—No. X.—APRIL 1st, 1850.

REMOVAL OF NUISANCES.

The 11th and 12th Victoria, cap. 123, passed in September, 1848, is generally found effectual in procuring the speedy removal of nuisances. The process is attended with very little expense, and the proceedings are so summary as to admit of no delay. Upon notice from two householders, the Town Council or parish authorities apply to a justice for a summons, and the offender, on the facts being proved before two justices, is ordered to remove the nuisance; in default of which, within a limited time prescribed, the complainants do so at his expense. It must be proved that the nuisance is calculated to injure the health; and twenty-four hours' notice must be given prior to the entry on the premises for the purpose of inspection, except in cases of emergency, of which the acting parties must be prepared to produce evidence.

In general, the order to remove the nuisance produces the desired effect; but a case recently tried near Southampton, and reported in another part of this number (page 485), shows that some caution is requisite in the adoption of ulterior proceedings when the order is not obeyed. When a question arises whether a certain nuisance is or is not prejudicial to health, there is often a clashing of opinion; and the jury being called upon to weigh the testimony of several witnesses, who flatly contradict each other, are not unlikely to be nearly equally balanced between the two opinions. There is scarcely a nuisance, however flagrant, which has not its advocates. Even the cleansing of cesspools has been declared to be a wholesome employment, and the robust constitutions of some of the night-men are adduced as evidence. On the other side, there are sanitary quacks who fancy they can smell an epidemic in almost every street. In the case above alluded to, it cannot be doubted that some effluvium was emitted during the process of bone-boiling and tallow melting; and it is notorious that such operations are often attended with extremely noxious exhalations. The extent to which the effluvium would be transmitted would depend, in a great degree, on the state of the atmosphere. It might be carried by the wind further than seventy yards, and in this case the neighbours might have just cause of complaint, which would, without doubt, be supported by medical testimony. There is a peculiarity in the act, which occasions some difficulty in establishing the requisite proof, namely, that the charge must be specific, having reference to the particular time at which the offence was committed, and twenty-four hours' notice must be given before entry is made on the premises for the purpose of examination and obtaining evidence. When, therefore, the source of nuisance is capable of removal, it often happens that, on inspection, no tangible cause of complaint is found to exist, and, on the following day, the nuisance is as bad as ever. This difficulty applies especially to the nuisance arising from pigs; and we have known numerous attempts made to convict a notorious pig-keeper, who was a constant annoyance to his neighbours, which attempts always failed, because, during the twenty-four hours, the

pigs were removed. The failure of the parish authorities at Southampton may be attributed partly to the error of taking proceedings without sufficient evidence of the specific offence alleged against the bone-boiler.

INTRAMURAL INTERMENT.

The report of the Board of Health on a general scheme for extramural interment, contains a digest of the facts previously known, in reference to the abuses prevalent in grave-yards, with some additional statistics which appeared requisite, in order to complete the narrative. Upon the facts so collected and arranged, a recommendation is founded, which, if carried into effect, will bring about an entire revolution, placing the management of all funerals in a central Government Board or Commission. The subject of intramural interment is treated under two heads:—First, its effect on the public health; second, on the decency and solemnity of burial. We confine our observations to the sanitary question. It is stated, as a general deduction from the evidence of Dr. Lyon Playfair and others, "We may safely rest the sanitary part of the case on the single fact, that the placing of the dead body in a grave, and covering it with a few feet of earth, does not prevent the gases, generated by decomposition, together with the putrescent matters they hold in suspension, from permeating the surrounding soil, and escaping into the air above and water beneath."

The evolution of gases is not uniform, as it depends, in some degree, on the comparative impermeability of the coffins, the nature and condition of the soil, and other circumstances. Under pressure, in strong leaden coffins, atmospheric air being almost entirely excluded, the nature of the decomposition is considerably modified, and the result less offensive. In the absence of resistance, and under circumstances favourable to the putrefactive fermentation, the quantity of gas is much greater. Some gases are more readily absorbed by the soil than others. Among the latter may be mentioned carbonic acid, which frequently exudes through the soil into newly-made graves, and has, in some instances, occasioned the death of the grave-diggers. We are informed in the report:—

"Dr. Playfair estimates that the amount of the gases evolved annually from the decomposition of 1117 corpses per acre, which is very far short of the number actually interred in the metropolitan grave-yards, is not less than 55.261 cubic feet; but as 52,000 interments take place annually in the metropolis, according to this ratio the amount of gases emitted is equal to 2,572,580 cubic feet, the whole of which, beyond what is absorbed by the soil, must pass into the water below, or the atmosphere above."

The abominations too often perpetrated in the performance of pauper burials have long been a matter of notoriety; and the "double graves" (a term used to denote a pit or hole in which a dozen or twenty bodies are buried) have been sufficiently described and discussed in the newspapers. It is also needless here to recapitulate the statements respecting grave-yards, reported many years ago as *quite full*, and which, nevertheless, have been in constant use up to the present time. These and other abuses are described in detail in the report, on the authority of the several inspectors appointed by the Board of Health to visit the grave-yards. It is computed that there are, in the metropolis, about two hundred public and private burial-grounds, although

the queries issued by the Board of Health have been answered only by one hundred and thirty-eight of the parties addressed.

The metropolis, however, is not the only place in which a reform of the system of interment is required. Numerous instances from the provinces are reported, respecting which we need only quote the following paragraph :—

"These examples may suffice to show that, deplorable as may be the state of the grave-yards and cemeteries of the metropolis, the condition of those in the provincial towns is still worse."

The vaults under churches, and in connection with grave-yards and cemeteries, have also been examined, and are described, in general terms, as unwholesome, pestilential, and dangerous to the health. In some cases, the destruction of the coffins, by decomposition or by the weight of others placed over them, the consequent exposure of the remains, with the evolution of gas, fully substantiate the denunciation.

There is, however, some exaggeration in this part of the report, as well as in that which relates to the cemeteries and the more decently-managed burial grounds. This high colouring was probably considered necessary, on account of the apathy of the public. We have visited vaults and burial grounds, even in the metropolis, where no unpleasant odour was perceptible. We have seen sheep grazing among the tomb-stones, deriving nourishment from grass fertilised by the results of decomposition under ground; and, far from loathing the mutton, we admired the wise provision of nature—the circulation of elements by which animal and vegetable life mutually reproduce each other. We have seen sextons and other officials, at an advanced age, apparently uninjured by their frequent visits to vaults, which are now condemned in a general anathema. We have drunk remarkably good water from a well within a few yards of a burial-ground, and have eaten vegetables from soil saturated with rotten manure. From these facts we conclude that the most offensive compounds, when passed through the alembic of nature, become transformed into the elements of subsistence.

Without, in the slightest degree, advocating intramural interments generally, or palliating the atrocious abuses which need only be mentioned to excite unmitigated disgust, we doubt the policy of endeavouring to prove too much, and cannot admit the universal application of the "single fact" on which the Board of Health "rest the sanitary part of the case." The decomposition of matter, and the formation of new products, are regulated by fixed principles and definite proportions, and, so long as the equilibrium is preserved, no mischief can arise. The disposition to generalise for the purpose of establishing a "great fact," or supporting a favourite theory, may be carried to such an extent, that the remedy becomes an evil—and this is too often the result of investigations in which Mr. Chadwick is concerned. The discovery that a neglected cess-pool is a source of disease, led to the destruction of all cess-pools, and the flushing of their contents into the Thames. The exposure of abuses in over-crowded burial-grounds is now made the pretext for the annihilation of all burial-grounds, including several cemeteries, carrying the principle of centralisation into the entire system of interment, the appointment of a Government Commission, the establishment of a huge "dead-house," and the introduction of an arbitrary interference with domestic arrangements, to an extent not likely to be at all acceptable to the public.

It is proposed to form two or three large cemeteries, with a reception house or houses, a staff of superintendants, and a gigantic establishment, comprising all the paraphernalia relating to the funeral rites, with steam-boats and railway-hearses. The whole is to be under one management; and it has been rumoured, that the salary of the head commissioner is to be £5000 per annum. Time will shew whether this rumour is well-founded, and whether Mr. Chadwick is to be the national undertaker. Reasoning *à priori* we should anticipate this result, in which case Mr. Walker might exclaim,

"Sic vos non vobis nidificatis aves
Ego hos versiculos feci, tulit alter honores!"

It is worthy of remark, that in the Report of the Board of Health, comprising 172 pages, *five lines* are occupied with an allusion to the labours of Mr. Walker on this subject during his whole life.

"It is but just here to observe, from the most recent evidence above cited, how fully the representations as to the nature and extent of the evils in question, early and perseveringly made by Mr. Walker, and brought before Committees of the House of Commons by Mr. Mackinnon, have been substantiated." (Page 51.)

Mr. Walker will probably be rewarded *after death* by the erection of a mausoleum to his memory in the cemetery of Mr. Chadwick.

THE SEWERS OF THE METROPOLIS.

The Commissioners of Sewers as well as the public are now suffering from the effects of the mismanagement and imprudence of the late commissioners. Messrs. Chadwick and Company having diverted the contents of all the cesspools of London into the Thames, and thereby created an intolerable nuisance, which they had not the ability to abate, advertised for plans, on the chance that some practical engineer might suggest a remedy. But in so doing they omitted to give the requisite data on which alone a practicable plan could be founded. About 160 plans have been sent in, and some months have been occupied in their investigation by a committee.

The present commissioners being practical men, and more competent than their predecessors to grapple with the subject, have found themselves entangled in a most arduous undertaking, and have discovered the abortive nature of the scheme by which it had been intended to attain the desired object. A large number of the plans, although possessing some merit, are totally inapplicable for want of accuracy in the levels and other data which ought to have been furnished to the competitors; others are based upon the assumption that the Thames is the natural and proper outfall for sewage; others are of a most complicated and expensive nature, and we believe none of the plans embrace the entire field of the operations in a practicable and satisfactory manner.

It, therefore, remains for the commissioners themselves to contrive a complete plan for draining the metropolis, using such suggestions as they may find in the chaos of documents before them. This labour is imposed upon men at the head of their professions as architects and engineers, who have pressure of other business on their hands, and who must, in order to perform the task, give up a large proportion of their valuable time without remuneration—and subject, of course, to the approval of the *superior tribunal*—the General Board of Health.

THE WATER QUESTION.

On taking a birds'-eye view of the proceedings of the several parties engaged in the water controversy, we observe but little, if any, progress towards a rational and practical result. The only two new companies which survived the opening of Parliament (namely, the Henley and the Watford), received a check from the Board of Health, which recommended, in February last, "that the works for supplying the public with water should be under the same public jurisdiction or management with works of drainage, paving, and surface cleansing. That apart from the merits of any particular scheme of new Water-Works, and pending the investigations as to the practical means of applying the foregoing principle to the metropolis, it is inexpedient to sanction the investment of fresh capital in the same field of supply, as it is probable that the new works will have to be repurchased; and there can be no security that these will be applicable to the arrangements that may be hereafter recommended."

The water agitators, instead of meeting in a rational manner to condemn, denounce, and oppose this projected system of centralization, continued their isolated exertions, each party calling public meetings, at which resolutions were passed favourable to the crotchet of the party calling the meeting. Thus these meetings neutralised each other, leaving the question at issue in *statu quo*. It is, however, due to all parties to state that they have opposed the principle of a Government Water Commission, this being incompatible with their several projects; but all have failed to point out, with sufficient force, the abuses, irresponsibility, and reckless expenditure inseparable from a Government Commission of the kind proposed. With the Woods and Forests before their eyes—with the sewers under their nostrils, can it be supposed, for a moment, that the public will be so mad as to allow the water supply to be consigned to the same jurisdiction?

While this impending danger is over our heads, the Parochial Water Supply Association, which was founded to watch and counteract any such sinister designs, appears to be wasting its energies in grasping at a shadow called "Parochial Representation." The fallacy of this monomania arises from the perversion of two propositions:—

1st. That water, a primary necessary of life and essential of health, an indispensable element of domestic comfort and decent social habits, furnished by Providence for human use without skill or labour, is not a proper object of mercantile profit or private speculation, and that an unlimited and pure supply ought to be secured to the community at the bare cost of its convenient distribution.

2nd. That the parochial authorities ought to have such control over the supply as to ensure to all the parishioners a sufficient quantity at the lowest possible rate.

In accordance with this theory, it is proposed that each metropolitan vestry should appoint one member (in the larger parishes two or three), to constitute a chamber of representatives. But, as a board of one hundred and fifty directors could not act, it is proposed that they should elect from among themselves six or eight directors to do the work and receive the salaries.

Thus six or eight parishes out of the entire number would be represented, and at each annual election of directors the metropolis

would resolve itself into a bear garden, in the struggle for the loaves and fishes and parochial representation. Already we find several gentlemen particularly eager in support of this scheme, apparently forgetting their own fundamental proposition, that water, being a free gift of Providence, ought not to be an object of private emolument.

It is another part of the project, that the pipes and machinery are to be the property of the parishes, each parish raising its proportion of capital on mortgage of the rates, and thus creating a "national debt in miniature."

It appears to be forgotten that the parties lending the capital for the purchase of pipes, &c., would virtually be the proprietors of the works, with this advantage, that their regular dividend (or interest on their capital) would be secured, instead of being liable to fluctuations from nothing up to six per cent., which latter is a rare exception to the general rule.

The public would not be likely to gain by this arrangement, as some companies pay no dividend, others one or two per cent., and the average considerably less than the ordinary rate of interest*. This objection is combated by the proposal to buy up the pipes and machinery of the Companies at the price of old iron—a measure more in accordance with the principles of the Communists in a neighbouring country, than with the practice of the British Houses of Parliament.

With a view of arriving at a correct conclusion respecting the best sources for obtaining water with reference to quality, quantity, and economy of supply, we have taken up the subject in all its branches, and from the information thus collected, we think it will not be difficult to show that a plentiful supply of water may be obtained without the aid of a government commission—that parochial controul may be secured without parochial "representation"—and that it is a fallacious principle of economy to saddle the public with the risk which private capitalists are willing to bear, subject to such controul and limitation of interest for their money as the welfare of the community may demand.

We intend to conclude our articles on the water question next month, the present number being already sufficiently diluted.

THE EXHIBITION OF THE WORKS OF INDUSTRY OF ALL NATIONS.

We take this opportunity of directing the attention of our readers to an advertisement stitched into this number, describing the proposed arrangements for the National Exhibition. The principles upon which this is to be conducted differ in one respect from those adopted at the late exposition in Paris. In the French exposition, only French manufactures were admitted, in England the doors are open to the whole world. This honourable competition among all nations will afford a general stimulus to industry, and promote pacific relations by encouraging commercial intercourse.

* The New River Company is not included in this observation, that Company having derived its profit not merely from the supply of water, but from the proceeds of improved landed property and other resources resulting from its great antiquity and fortuitous circumstances.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

At a Meeting of the Council on the 6th of February, certain medicines and handbills describing the same*, issued by a Member of the Society, styling himself a Member by Examination, were laid on the table, the attention of the Council having been directed to the obscene and disreputable nature of the said articles. It was the unanimous opinion of the Council that the character of the Society was compromised by this proceeding, and especially by the prominent use of the name of the Society as a means of puffing a very disreputable quack nostrum. The Secretary was instructed to write to the party so offending, giving notice that the subject was under the consideration of the Council.

At the ensuing meeting of the Council on the 6th of March, a letter from the said Member was read, in which he stated, that having retired from the Society, and returned his Diploma, which accompanied his letter, he did not consider it necessary to reply further to the communication. On which it was resolved unanimously, that his name be erased from the List of Members.

The above statement is published in order to exonerate the Society from the imputation of sanctioning conduct of this description; but the name of the offending party is not published, this exposure being deemed unnecessary under the circumstances.

THE SALE OF POISONS.

Some correspondence having taken place between the Committee of the Provincial Medical and Surgical Association and the Committee of the Pharmaceutical Society, a meeting of the two committees was appointed. Dr. Sibson and Dr. Hodgkin represented the Committee of the Association, and produced communications from the other members, in which were comprised proposals for placing certain restrictions on the sale of poisons, especially arsenic. After much discussion on all the details of the proposition, and the practical operation of the several restrictions, it was the opinion of all who were present that some modification was necessary. It was generally admitted that the unlimited sale of poisons by unqualified persons was the chief source of danger, and it had been proposed to recommend to the Legislature to confine the sale by retail of certain deadly poisons in common use to medical men and Chemists and Druggists. This, however, was shown to be impracticable, unless preceded by a bill providing some method of defining a Chemist and Druggist.

By extending the prohibition to a number of poisons now sold promiscuously by a variety of unqualified persons, an inducement would be offered to such persons to assume the name of Chemists and Druggists, for the purpose of retaining the privilege which they would afterwards exercise probably even to a greater extent than

* The case is alluded to in the *Pharmaceutical Journal* for February, page 345.

before, on account of the notoriety given to this branch of trade by the futile endeavour to restrain it.

It was therefore resolved, under existing circumstances, that the recommendation of the committee should be confined to the sale of arsenic; and a report to this effect, comprising some general propositions, was agreed upon.

The following is the substance of the report, as amended and adopted by the Council:—

The sale of arsenic by retail should be restricted to medical men and Chemists and Druggists.

Arsenic should only be sold to male adults, known to the vendor; personally, or on production of their written order.

The vendor should enter the sale in a book, with the date, and the object for which it is required, to which the applicant and a witness (one or the other being known to the vendor) should sign their names, unless a written order is brought, in a hand-writing known to the vendor, which order should be pasted in the book.

It was further resolved, that a memorial should be forwarded to the Secretary of State, with a copy of the above propositions, and that a deputation should attend to give any explanation that might be required, in the event of a communication being received from the Secretary of State appointing an interview.

Dr. Hastings (of Worcester), the President of the Provincial Medical and Surgical Association, has also been in communication with the Secretary of State on behalf of the Committee, and it is probable that an interview will have taken place before the publication of this number, although not in time to admit of the insertion of the report.

The policy of the co-operation of the two bodies (Medical and Pharmaceutical) has been fully demonstrated; for if the Medical and Surgical Association had promulgated their original propositions, the Pharmaceutical Society would have been under the necessity of opposing a portion of them on practical grounds. The propositions which have been mutually agreed upon are calculated to produce a partial effect, and to lead to a further consideration of the more comprehensive measure relating to the qualifications of those who practise Pharmacy.

PHARMACEUTICAL MEETING,

MARCH 13th, 1850.

MR. JACOB BELL IN THE CHAIR.

The following papers were read:—

ANALYSIS OF AN ALUMINOUS WATER.

BY MR. THOMAS BEESLEY.

The mineral water, the subject of the following analysis, occurs about a mile from Banbury, on the right side of the horse-road ascending the hill to the hamlet of Overthorp. It is remarkable for containing a considerable proportion of tersulphate of alumina, and for depositing an abundant precipitate of a *basic* sulphate of alumina on exposure to the air. This deposit is sometimes, under favourable cir-

cumstances, very conspicuous on the side of the road, and has often drawn attention to its source. It is exceedingly light and flocculent, and cannot be mistaken for carbonate of lime; popularly, it is supposed to be "magnesia."

Although I have been acquainted with the water and the nature of its deposit for some years, I had not, until a few months since, an opportunity of making anything like a complete analysis. Indeed, it is with great difficulty that a sufficient quantity of the water, pure enough for that purpose, can be obtained, owing to the peculiar position of its source, and its scanty flow. It is necessary that all the water submitted to analysis be collected at one time, as I have found not only the gross amount, but the relative proportions of its solid constituents to vary greatly at different times.

Qualitative analysis showed the presence of potash, soda, lime, magnesia, alumina, sulphuric acid, chlorine, and silica, as well as considerable organic matter, probably accidental. Those substances usually existing in very small proportion in mineral waters, were not particularly looked for*, in consequence of the small quantity of water at command.

The water is distinctly acid, both before and after boiling, sufficiently so to be *tasted*.

On boiling, or exposure to the air, a flocculent precipitate falls, which, when dried in the air, contains, in addition to about half its weight of water,

Alumina	75.0
Sulphuric Acid	25.0
	100.0

An early analysis of this deposit gave exactly three equivalents of alumina to one of sulphuric acid—a trisulphate of alumina; but further experiments on different specimens showed the proportion of acid and base to vary considerably. It is dissolved in the water by means of free carbonic acid. 10,000 parts of water deposit .1390.

It is unnecessary to occupy space with the details of the analysis. The ordinary methods were adopted; and the weights were taken by a balance sensible to $\frac{1}{10}$ of a millegramme.

Solid constituents of 10,000 *parts of Water.*

Sulphate potash	.1551
Sulphate soda	1.6548
Sulphate lime	6.3077
Sulphate magnesia	2.4343
Tersulphate alumina	1.9669
Basic sulphate alumina	.1390
Chloride magnesium	.7480
Silica	.3000
	13.7058

The whole of the alumina was no doubt originally in the state of tersulphate, and became reduced to that of *basic* sulphate by the action of the acid salt upon the calcareous matter of the water-channel.

* Excepting phosphoric acid, which was carefully tested for in a considerable quantity of sediment without success.

To present its formula in the original state, we must transform the basic sulphate into tersulphate alumina, and deduct a corresponding proportion of sulphate lime. The water, as it issues from its source, contains floating portions of the deposit, which are not reckoned in the analysis, being removed by the necessary filtration. This would still further increase the tersulphate alumina, and diminish the sulphate lime.

The sulphate alumina is probably derived from the action of sulphuric acid, arising from the oxidation of iron pyrites, upon the alumina of the clay.

I have been told that this water is sometimes used by the country people as an eye-lotion—a use for which its astringency peculiarly fits it.

High Street, Banbury.

ON THE VARIABLE STRENGTH OF TINCTURE OF OPIUM.

BY MR. ALFRED ALLCHIN.

Some difference of opinion having been expressed with reference to the proportion of solid matter contained in Tincture of Opium, I was induced to make a few experiments, not only with the view of ascertaining whether the statement of Mr. Phillips, in his Translation of the Pharmacopœia, be correct, but also of determining the extent of variation in specimens of the tincture obtained from different sources. The results of the enquiry appeared to be of sufficient practical importance to justify their introduction to the notice of the Pharmaceutical Society.

Tincture of Opium was prepared strictly according to the instructions of the London Pharmacopœia. A good specimen of opium was selected, which was dried by means of a water-bath, and the loss in the process of desiccation was found to be 20 per cent. Of this dried opium, three ounces (troy weight) were macerated for fourteen days in forty fluid ounces of proof spirit, sp. gr. .920, the ingredients being frequently agitated. The tincture was strained at the time specified, and one fluid ounce of it was carefully evaporated. The solid residue after being dried by the heat of a water-bath, weighed twenty-five grains. This result accords with Mr. Phillips's statement, that nineteen minims of the tincture contain one grain of opium. It is not, however, quite correct to represent the solid constituents of laudanum as "opium." The residue of the evaporation of the tincture is an extract which contains, probably, nearly the whole of the active constituents of the opium used in making it; and in estimating the strength of laudanum, by comparison with opium, it is important to bear in mind, that about one and a half grain of crude opium is used in making nineteen minims of the tincture.

In order to determine what amount of variation existed in the tincture of opium met with in commerce, several specimens were obtained from Dispensing Chemists in different parts of London, and on carefully evaporating these and drying the solid residues as before, the following results were obtained:

Specimen No.	1,	yielded	1 grain	of	solid residue	from 19.2	minims.
"	2,	"	1 grain	"	"	20	"
"	3,	"	1 grain	"	"	21	"
"	4,	"	1 grain	"	"	22	"
"	5,	"	1 grain	"	"	26.7	"
"	6,	"	1 grain	"	"	26.7	"
"	7,	"	1 grain	"	"	28.2	"

The discrepancies in these results are so considerable that the subject appeared to be well worthy the attention of the Members of this Society. Is the difference which has been found to exist in the strength of this very important medicinal agent, as met with in commerce, due to circumstances over which the Chemist has but imperfect controul, such as variations in the quality of the opium used in making it, or must it be ascribed to errors in the manufacture? I fear that in too many cases moist opium is substituted for dry, without making the proper allowance for moisture; and that even in some instances a further error is committed by substituting the avoirdupois for the troy ounce.

While so much attention is being very properly directed to the quality of the drugs and chemicals supplied by the wholesale dealers, it surely behoves the Dispensing Chemist to be equally scrupulous with regard to those medicines which are prepared by himself.

The Chairman pointed out the great importance of the subject of this paper, and alluded to the circumstance that, in addition to the causes of variation in strength referred to by Mr. Allchin, there was another source of discrepancy, in the variable quality of the opium used; for it was well known, that the proportion of morphia in different specimens of this drug, varied to a considerable extent.

Mr. Lawson stated, that he had found, from repeated experiments, that a considerable quantity of morphia was left in the pressed dregs of tincture of opium, made according to the Pharmacopœia.

The discussion on the subject of medicinal naphthas was now resumed. The following is Mr. Scanlan's paper, by which the subject was introduced at the previous meeting.

TEST FOR DISTINGUISHING ACETONE FROM PYROXILIC SPIRIT.

BY MAURICE SCANLAN, ESQ.

It is now some years since Dr. Hastings introduced to the medical world naphtha as a new therapeutic agent in phthisis.

As there are several fluids to be met with under the name of *naphtha*, considerable doubt existed as to which of them should be used as "medical naphtha" by the compounder. The only tests relied upon, I believe, for a long time were miscibility of the naphtha with water without becoming milky, and its not being blackened by the addition of a drop or two of concentrated sulphuric or of nitric acid. Any "wood naphtha" met with in commerce, when repeatedly rectified over quick lime, will be found to stand these tests; and hence, when so rectified, was considered to be the proper naphtha to be used in medicine.

A question subsequently seems to have arisen as to the dependence

to be placed upon these tests, and it was asked, Is it pyroacetic or pyroxilic spirit that should be used?—and how are we to distinguish readily between the two? accordingly we find this subject fully discussed in the *Pharmaceutical Journal* so far back as the year 1843, vol. iii., p. 33.

In this article upon Naphtha, it is stated that pyroacetic spirit, or acetone, "is the kind of naphtha which Dr. Hastings uses;" and a mode of distinguishing this fluid from pyroxilic spirit, or ordinary wood naphtha, is pointed out as suggested by Dr. Ure. It is the way in which nitric acid acts upon these two different substances. This test may be depended upon; but is almost dangerous, as nitric acid of sp. gr. 1.45 acts with explosive violence upon acetone.

Chloride of calcium affords us a much more ready and certain mode of distinguishing acetone from wood-spirit naphtha, the former having no action upon it, while the latter dissolves and combines with it. It will be found that a drop or two of a *saturated* solution of chloride of calcium, added to pyroacetic spirit in a test tube, is immiscible with it, and separates after agitation, whilst such a solution is instantly dissolved by the pyroxilic spirit.

It should be ascertained beforehand, that the "naphtha" under examination does *not* separate into two fluids, or become milky on the addition of water.

Mr. Bell, in resuming the discussion, said that, although it was very important to have a ready means of distinguishing the different liquids which are sold under the common name of *naphtha*—and Mr. Scanlan appeared to have supplied this deficiency—yet there was another equally desirable object to be attained, and that was to ascertain which kind of naphtha ought to be used in medicine when prescribed for pulmonary affections. He was glad to see that Dr. Hastings, who had originally introduced the use of naphtha as a medicinal agent, was present, and he hoped that he would favour the meeting with the result of his experience on the subject. There were several specimens of naphtha on the table, some of which had been used under Dr. Hastings's observation, and he would suggest that the test should be applied to these, so as to determine whether they were acetone or pyroxilic spirit.

On applying Mr. Scanlan's test, it was found that those specimens which had been most approved of as medicinal agents, were pyroxilic spirit.

Dr. Hastings observed that the subject then before the meeting was one in which he was deeply interested. He had found from long experience, that some of the liquids, sold under the name of naphtha, afforded relief, by allaying irritation, in certain cases of pulmonary affection; but while this was the case with some of the naphthas of commerce, there were other specimens which produced an opposite effect, and promoted instead of allaying irritation. He had never been able to ascertain what the real cause of this difference in effect was, and the uncertainty as to whether a patient got the right kind of naphtha or not, had been to him a constant source of annoyance and difficulty. Some time ago it was suggested to him by several chemists who had directed their attention to the subject, that the true medicinal naphtha—that which, from experience, he found to be beneficial—was

acetone, or pyroacetic spirit, and not pyroxilic spirit; and accordingly several manufacturers, and among them the house in which Mr. Scanlan is engaged, had carefully prepared pyroacetic spirit in a state of considerable purity for medicinal use. He could not say that his experience in the use of this, or of any of the specimens which by the use of Mr. Scanlan's test were proved to be acetone, enabled him to give the preference to acetone over pyroxilic spirit, and he still felt that the difficulty hitherto experienced was not yet removed. It appeared also that the proposed test was not a conclusive one, for he had found that it gave the same reaction with coal-tar naphtha as with acetone.

Mr. Redwood explained that the test was only intended to be used as a means of distinguishing between acetone and pyroxilic spirit. He thought it was now sufficiently evident that the kind of naphtha best suited for use in the cases in which it was prescribed by Dr. Hastings, was purified pyroxilic spirit, and not acetone, or pyroacetic spirit.

Mr. Morson had no doubt that pyroxilic spirit, and not acetone, was what Dr. Hastings referred to under the name of naphtha. It was much to be regretted, that the term *naphtha* had been used to designate this liquid, as it was a very indefinite term. He would suggest the substitution of the term "wood spirit." It was not all specimens of wood spirit, however, that could be used medicinally in the cases alluded to. Most of the wood spirit of commerce was very impure, and required a particular process of purification to render it fit for medicinal use. It might be purified by largely diluting it with water, when an oily substance separates, after the removal of which, the spirit may be recovered by distillation.

AN IMPROVED PROCESS FOR MAKING LEAD PLASTER.

BY MR. W. BARTLETT.

I purpose this evening to invite the attention of the meeting to the mode of making Emp. Resinæ, for spreading on linen or calico. There has long been felt a difficulty in obtaining spread plaster that will retain its consistency, not only in the great heat of an Indian climate, but also in the varying temperature of this country. I have been informed that when required for the East Indies it is sent out in the form of rolls, as it would be found totally unfit for use on its arrival if spread in this country. Various means have been tried to remedy this defect; sometimes more or less resin is added to the Emp. Plumbi, as it may be required for summer or winter use; but I consider that the difficulty arises from the manner in which the Emp. Plumbi is made, and this is the point to which I wish particularly to draw your attention. The following is the method which I suggest:—To 7lbs. of the semi-vitrified oxide of lead and 10lbs. of olive oil, *one gallon* of water is added at intervals during the process of boiling, which should be over a clear fire of charcoal or coke, no flame being allowed to come in contact with the vessel. *It should be well stirred for eight hours without intermission*, and then removed from the fire, and allowed to remain until cold. The glycerine formed during the process is not washed or pressed out, which would be the case if, whilst in a semi-fluid state, it was rolled in the usual manner,

for on the presence of the glycerine and the long continuance of the boiling, the utility of the plaster in obviating the difficulties beforementioned depends; and during the process I consider it is not deviating from the Pharmacopœia. When required to form the Emp. Resinæ the proportion of resin is added according to the Pharmacopœia, after the Emp. Plumbi has been melted by the application of steam, no other heat being allowed after the Emp. Plumbi is made. This plaster, if spread on unglazed calico, will be found fit for use in any climate, and will retain its properties even in the torrid or the frigid zone. I have here some Emp. Plumbi, made according to the formula and manipulated in the manner I have described, and some of the Emp. Resinæ, and some spread for use in this country and some for India. I have also a curiosity, which proves what I have advanced, some plaster which has been spread about a quarter of a century. It has travelled from this country to Buenos Ayres; from thence it was taken overland to the province of La Riaga, during part of which journey the thermometer stood at 115° to 120° in the sun, and 95° to 100° in the shade. It again returned to Buenos Ayres, being 1000 miles by land each way, and reached England on the 5th of April, 1829, since which time part of it has been used for dressing, and found to adhere quite as well as when new.

In making Emp. Plumbi to melt with Cerat Saponis, I prefer using the oxide of lead instead of the semi-vitrified, but it requires great care in manipulating; a hood should extend over the furnace to carry off the fumes. I trust these remarks will not be considered out of place, but prove of practical utility to the Members of the Pharmaceutical Society.

1, *Bretton Terrace, Chelsea, March*, 1850.

Mr. Redwood had no doubt that Mr. Bartlett's plaster was very good, and greatly superior to most of what was met with in commerce as machine-spread plaster; but he doubted whether its superiority was due to the circumstances indicated in the paper. No specific time could be fixed upon for boiling the plaster, as the duration of the process would depend upon circumstances over which the operator has not complete controul; and with regard to the retention of the glycerine in the plaster, there were objections to the adoption of this mode of operating, and he considered it by no means proved that the glycerine improved the quality of the plaster in any way. The question, however, was one deserving investigation.

MANNITE.

The Chairman directed the attention of the meeting to a specimen of mannite which had been presented to the Society by Mr. Read, of Regent Square. This article has been recently imported from Italy, and is proposed as a substitute for manna, on the assumption of its being more active. The Chairman observed, however, that its efficacy as a medicine has yet to be proved. He had some doubts whether it would be found as much more active than common manna as would be equivalent to its higher price; but its pretty crystalline appearance and perfect freedom from any disagreeable taste, were greatly in its favour.

APPARATUS FOR THE PREPARATION OF TINCTURES.

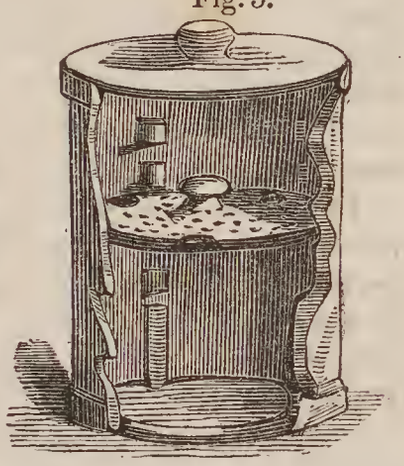
BY MR. SAMUEL GALE.

This apparatus, which is intended for the preparation of tinctures according to Dr. Burton's process, is made of brown stone ware. It consists of a cylindrical jar, with a lid which fits perfectly air-tight, being ground at the edge to a spherical surface by machinery. This part of the apparatus is similar to that used for preserving leeches, excepting that it is not perforated. The lid may be secured down by an iron clamp, as shown in fig. 1, or it may be made as fig. 3, for it is found that the mere weight of the lid, if it be carefully adjusted, will keep it so close as to prevent loss from evaporation. Within the jar there is a perforated diaphragm (fig. 2), which is fixed as shown in fig. 3, and this can be placed at any height from the bottom of the jar, so as to suit the nature of the ingredients used in making the tincture.

Fig. 1.

Fig. 2.

Fig. 3.



The objects contemplated in constructing this apparatus* have been to provide an open-mouthed cylindrical vessel, with a perforated diaphragm, which can be fixed at any distance from the bottom, and with the means of closing the mouth so as completely to prevent the evaporation of spirit. The solid ingredients are placed on the perforated diaphragm, and are thus kept near the top of the liquid, so that it is unnecessary to shake the tincture during the process of maceration. Dr. Burton's paper recommending this mode of operating will be found in vol. 4., page 469 of this Journal.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Colquitt Street, March 15, 1850.

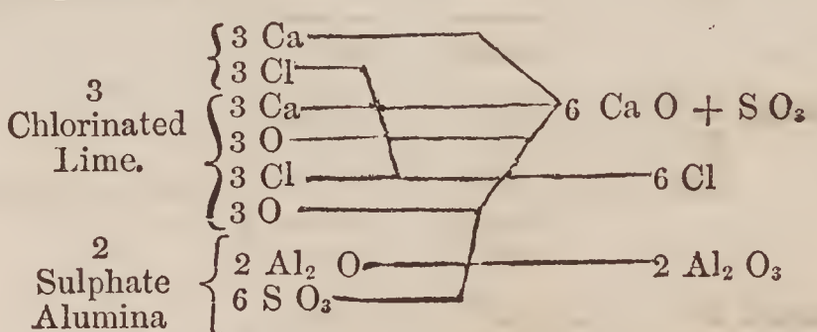
THE PRESIDENT IN THE CHAIR.

Dr. Inman resumed the subject of "The Specific Action of Medicines," and remarked, that salts of the metals were marked by the comparative length of time required to develop their peculiar action, and the long period during which their effects frequently continued. In the organic kingdom the reverse is observed, the action of these principles being very rapid and of short duration. Many of these medicines act on one portion of the system chiefly, some exalting and others depressing the natural functions. Thus aconite depresses the

* The apparatus is made by Mr. Stephen Green, Princes Street, Lambeth.

sensitive system, leaving the muscular and mental nervous system uninfluenced. Strychnia exalts the muscular nervous system, producing tetanic spasm, &c., without affecting consciousness, while opium exercised a direct influence on the brain. Dr. Inman quoted several cases, detailing the peculiar symptoms caused by poisonous doses of aconite, strychnia, opium, conium, belladonna, &c., which illustrated his subject in a very interesting manner.

Mr. Mercer then read a paper on "Disinfectants." After some general remarks on infection and miasma, stating that offensive odours from decomposing matter are closely connected with the malaria which spreads disease, and referring to the poisonous properties of HS, PH_3, NH_4S, CH, Cy, and CO_2, &c., the products of organic decay, Mr. Mercer referred to the numerous methods and agents employed for disinfecting purposes, and of these none is so good as fresh air in abundance. Water is also very valuable, and heat has been successfully employed in disinfecting garments, &c., from the plague. Charcoal has also been employed in virtue of its powers of absorption. The chloride of zinc (Burnett's), nitrate of lead (Ledoyens), and perchloride of iron, &c. (Ellerman's), are rival claimants to public favour. Mr. Mercer considered an objection to the first was, that HS did not decompose acid salts of zinc, and this salt became acid when partly decomposed. The nitrate of lead does not decompose free CH, CO, or CO_2. The last Mr. Mercer considered the best; it is made by treating the residue (which is left after wasting the iron pyrites with sulphur), with H Cl, the pyroligneous acid being added afterwards. This agent solidifies and deodorises most offensive matter very completely, but Mr. Mercer doubted whether any liquid disinfectant had any effect on miasma. The solution of chloride manganese is spoken very highly of by Mr. Young. Chlorine is by far the most valuable disinfectant, and is used either by direct fumigation or by gradual elimination, as in chlorinated lime and Collins's disinfecting powder. The latter is very valuable, and the following decomposition occurs by the action of the atmosphere upon it;—



Or, 3 Ca Cl, Ca O Cl O + 2 $Al_2 O_3$, 3 SO_3 = 6 Ca O, SO_3 + 2 $Al_2 O_3$ + 6 Cl

Dr. Inman remarked that the subject was a very interesting one; he thought that the miasmata were quite independent of offensive gases, and he doubted if chemical agency had any effect upon them. These offensive gases were certainly frequently associated with disease; but they were equally so with the malaria of plague, yellow fever, small-pox, cholera, typhus, &c. &c., which must be distinct influences. It was also found that night-soil men, sewer cleaners, &c., were not more subject to typhus, cholera, &c., than others; in some cases, less

so. No fever occurred among the men employed in the removal of the cemetery at Paris, though the stench was such as to render many insensible. On one occasion in which yellow fever broke out on board ship, the only persons who escaped slept immediately over a cargo of hides, which had a very powerful and disgusting odour. He had witnessed some remarkable deodorising experiments, both by Burnett's and Ledoyen's fluid. It was well known that trees had the power of decomposing the miasm arising from marshes. Rome had been subject to malaria ever since the wood was destroyed between it and the Pontine marshes.

Mr. EDWARDS then detailed some analyses he had made of trisnitrate of bismuth, and gave a general review of the salts of bismuth; the oxide appeared to be almost inert, but he found a very large proportion of it in the trisnitrate of commerce. If the directions of the Pharmacopœia are strictly followed, a uniform preparation is the result, but any departure from them causes variation, as the subsalts are numerous. Among six samples obtained from respectable dispensing houses in London and Liverpool, he found the following variations:—

	Per cent. found.	Theory.	Formula.
No. 1. contained $Bi O_3$	77.23	79	
NO_5	16.2	15	
Aq.	6.	6	$Bi O_3, NO_5 + Aq.$
	99.43	100	
No. 2. contained $Bi O_3$	79.4	79.6	
NO_5	13.8	13.7	
Aq.	6.6	6.7	$4 Bi O_3, 3 NO_5 + 9 Aq.$
	99.8	100.	
No. 3. contained $Bi O_3$	87.46	88.13	
NO_5	2.32	1.83	
Aq.	10.1	10.04	$11 Bi O_3, 3 NO_5, + 9 Aq.$
	99.88	100.	
No. 4, contained $Bi O_3$	88.1	88.28	
NO_5	10.	10.	
Aq.	1.6	1.72	$2 Bi O_3, NO_5 + Aq.$
	99.7	100.	
No. 5, contained $Bi O_3$	73.4	73.5	
NO_5	16.38	16.5	
Aq.	9.5	10.	$Bi O_3, NO_5 + 3 Aq.$
	99.28	100.	
No. 6, contained $Bi O_3$	80.08	80.2	
NO_5	18.5	18.28	
Aq.	1.3	1.52	$2 Bi O_3, 2 NO_5 + 1 Aq.$
	99.88	100.	

The SECRETARY then announced that the Council had decided on

opening the Laboratory of the Royal Institution for Practical Instruction in Pharmaceutical Chemistry. The course will commence on April 3, 1850, under the direction of Mr. Hamilton, and will be introductory to that pursued by the Pharmaceutical Society. Attendance on Wednesday evenings, from eight to ten.

THE BIRKENHEAD CHEMICAL AND PHILOSOPHICAL SOCIETY.

ESTABLISHED FEBRUARY, 1850.

The object of this society is similar to that of other provincial Chemists' Associations, namely, the extension of Chemical and Philosophical knowledge, by means of lectures, meetings, discussions, the circulation of books, and such other proceedings as may be deemed expedient.

In consequence of the limited number of Chemists and Druggists in that locality, it has been found advisable to extend the privilege of membership to scientific or professional men, not immediately connected with the business of Pharmacy, but interested in science generally, and disposed to assist in the object of improvement and the circulation of knowledge.

We are favoured with a copy of the rules, by which we are informed that the members meet monthly at the houses of each other to read and discuss papers, &c. Arrangements are made for establishing a circulating library. The Committee of Management consists of Chemists and Druggists. For the present year, Mr. Warry is President, Mr. Foulkes Vice-President, and Mr. Johnson Secretary and Treasurer. Two meetings have been held (viz. February 21 and March 6), on which occasions the following papers were read:—An introductory Address by the President; on the History of Chemistry, by Mr. Johnson, F. C. S.; on the Advantages of Chemistry in a Forensic and Commercial View, Mr. M'Dougal, M. R. C. S.; on Abstract Study and the Status of the Chemist, by the Rev. S.H. Booth, B. A.; Impurities and Adulterations in Gum Acacia and Acetic Acid, Mr. A. Stewart; A Method of Silvering Glass, Mr. Dutton; on Igneous Geology, T. C. Archer, Esq.

This is a favourable commencement, and we hope the society will prosper. It is satisfactory to observe the increasing tendency among the members of our body to associate together in their several localities for the purpose of scientific improvement. The regulations in each Association are adapted to the circumstances of the place, and although differing in minor details, the general tendency of the movement is the same, namely, the advancement of the Art and Science of Pharmacy.

ORIGINAL AND EXTRACTED ARTICLES.

NOTICE OF THE COPALCHI BARK:

A new and valuable Bitter analogous to the Cascarilla.

BY JAMES STARK, M. D.

Fellow of the Royal College of Physicians, Edinburgh.

In the course of some inquiries into the remedies used in Chili and Peru, I received from one of my correspondents in Chili a bitter bark under the name of *Natri*, which was stated to be much employed by the medical practitioners and natives of Chili in the treatment of intermittent and other fevers, and held in higher repute than even Peruvian bark itself. The bark and leaves sent enabled me to ascertain that the Natri was the produce of a species of Croton, but, from the want of the flowers and fruit, the particular species could not be ascertained.

In the course of a correspondence with my friend John Elliot Howard, Esq., Tottenham, he mentioned to me that a quantity of bark had been received by the Messrs. Gibbs, of London, from San Blas, which appeared to be analogous to, if not identical with, the *Natri*. A small quantity of the same bark had also been brought over from Santa Cruz, by a gentleman, who stated that it was there known under the name of *Chiquique*, and was *always* given to the Indians in fever cases, and was considered by the medical practitioners there as superior, in certain cases, to Cinchona bark itself.

Mr. Howard at once recognised this bark as the Copalchi bark of Goebel, a valuable Mexican bitter, described by him as the product of the Croton suberosum; and, through the liberality of the Messrs. Gibbs, that gentleman sent me first a few pounds to make trial of it in practice, and then the whole quantity imported into this country.

Though it has not been in my power to lay my hands on Goebel's description, I have satisfied myself as to this bark being that known in Europe since 1825, and described under the names of *Copalchi bark* and *Quina blanca*,—the product of one tree, variously termed *Croton suberosum* by Humboldt, Bonpland, Kunth, &c.; *Croton pseudo-china* by Schlechtendal and Nees von Esenbeck; and *Croton Cascarilla* by Professor Don.

The description of the bark given in the *Dictionnaire Universelle de Matière Medicale*, accurately corresponds with the specimens in my possession, as does also that given in the *Dict. des Drogues Simples et Composées*. In these articles it is described as a new and valuable bitter used in Mexico, similar in properties to Cascarilla, and believed to be the produce of the Croton suberosum of Humboldt.

It is to Schiede and to Nees von Esenbeck, however, that we are chiefly indebted for ascertaining the exact species of plant which yields the Copalchi bark, and showing by their descriptions and figures that the tree which they describe as yielding it is that formerly called by Humboldt the *Croton suberosum*. Schiede, as well as Nees von Esenbeck, found this copalchi (which is the Indian name) sold in the Apothecaries' and Druggists' shops at Jalapa, and over the province of Mexico, under the name of *Quina blanca*, and considered by them there as the finest and best sort of Cascarilla. Indeed, Schiede

was so convinced that he had discovered the true source of the best Cascarilla, that from the examination of the tree which produces this Quina blanca, he asserted that the best Cascarilla was the produce of the Croton Pseudo-china of Schlechtendal—now called by Professor Don the Croton Cascarilla.

Nees von Esenbeck only went the length of considering the Copalchi as closely resembling the Cascarilla, and gave, in the supplement to his splendid work the *Plantæ Medicinales*, most beautiful coloured figures of the copalké-croton in all its states, flowers, fruit, leaves, and bark, rendering it perfectly impossible ever hereafter to mistake the bark or plant which he describes. He also terms the tree the Croton Pseudo-china.

Copalchi bark was subjected to a minute analysis by Mercadieu, in 1825, who found it to contain no crystallizable alkaloid, but the following principles :—1. An astringent matter of a deep brown colour. 2. An excessively bitter principle (containing also an astringent principle), soluble in water. It is in this bitter principle that the febrifuge properties reside which the Physicians at Vera Cruz have recognised it to possess. 3. A green fatty substance. 4. A clear brown resin, insipid and inodorous. 5. A brown animalized colouring matter, insoluble in ether and absolute alcohol, but soluble in dilute alcohol and in water. 6. Starch. 7. Woody fibre. 8. Phosphate and oxalate of lime. The burnt ashes yielded hydrochlorate and sulphate of potass, oxides of iron and of manganese, carbonate and phosphate of lime, with traces of magnesia and silica.

Brandes, who analyzed this bark the year following, could not detect any crystallizable alkaloid, but recognised the bitter principle on which its active properties depended—a resin, concrete fatty oil, &c.

This bark is now undergoing a minute analysis by Dr. Douglas Maclagan and Dr. Anderson. Meanwhile, my friend, Mr. Howard, has made some trials to prepare the bitter principle in a pure state. The bark was exhausted by almost absolute alcohol; this tincture evaporated to dryness; the bitter principle removed from this extract by cold water, which left the residuum of waxy matter, and, on evaporating this aqueous solution to dryness, the bitter principle was obtained in dark brown, almost black, lustrous, but non-crystalline scales, of an intensely bitter taste. The bitter principle thus procured possesses the strange property of being deliquescent, requiring it to be kept in closely stoppered phials.

Copalchi bark yields an agreeable aromatic bitter to water, but especially to proof spirit. The tincture and spirituous extract, indeed, are agreeably aromatic, and on first tasting, leave on the tongue and palate a sweetish taste.

Since I received the first samples of Colpachi bark, I have made trial of it in a few cases, which seemed tolerably well fitted for testing its properties,—if it possessed any.

The first case was one of atony of the stomach and bowels, with weak and imperfect digestion, and irregular action of the bowels, at one time costiveness, at another slight diarrhœa, existing. In this case, the usual bitters, as gentian, quassia, and colombo, disagreed, exciting nausea, &c., while Peruvian bark and quinine increased the headache, and induced a feverish state of the system. The case, however, wonderfully improved under the use of the simple infusion of the Colpachi

of the strength of half an ounce of bark to the pint of boiling water given in table-spoonful doses three times daily.

In the second case in which trial was made of Copalchi bark, the patient suffered from irregularity of the bowels, but with this peculiarity (several instances of which came under my notice during the past winter during the prevalence of cholera), that twice daily, viz., at three o'clock afternoon and three o'clock morning, more or less violent spasmodic cramp in the bowels came on, preceded by shiverings and coldness, and terminating by a sweating stage. Quinine in 1½ grain doses, twice daily, had been given for two days, with the effect of completely checking these intermittent paroxysms, when it was obliged to be stopped, in consequence of its inducing violent headaches, flushing of face, and feverishness. The paroxysms immediately returned as before, but, on substituting infusion of Copalchi, giving a wine-glassful at two o'clock afternoon, and the same quantity at bed-time, the paroxysms were arrested, and have not since returned.

Like relief followed in another but milder case of the same nature. In this case, the cure was trusted entirely to the Copalchi, no other medicine being given, in order to see whether it really possessed any antiperiodic powers. It is, therefore, scarcely possible to doubt that it possesses some antiperiodic virtue, so that we can easily believe what is stated of its powers by the Mexican and Peruvian Physicians in arresting the paroxysms of intermittent fevers.

It has been used in several other cases, but without the results being so striking as to render its superiority to other bitters unquestioned. I am at present giving it in a case of epilepsy, in which all other bitters had disagreed, excepting that much neglected but valuable bitter, the trefoil (*Menyanthes trifoliata*), and the case, so far as it has gone, has succeeded satisfactorily under the use of the Copalchi bark. Dr. Bennett informs me that he is administering it to an epileptic case in the Royal Infirmary, apparently with marked benefit.

When I received the first few pounds of Copalchi bark, I sent some to the Royal Infirmary, and to the two principal Dispensaries, in order to let this bitter get a fair trial. I have not yet received reports from these institutions, but learn that in every case in which this bitter has been administered, it has given satisfaction, proving an agreeable light bitter. Being now in possession of the whole importation of this bark, through the liberality of the Messrs. Gibbs, and being anxious that its powers should be fairly and thoroughly tested by the medical men of Edinburgh, parcels of it have been sent to the Royal Infirmary, to the New Town and Royal Dispensaries, and to the Leith Dispensary; and the remainder lies with the Messrs. Duncan and Co., Druggists, at whose shops in Edinburgh and Leith, small quantities of the bark may be obtained gratuitously, by those who wish to prepare it for themselves. The Messrs. Duncan and Co. will also keep the infusion, decoction, tincture, and spirituous extract ready for prescription, charging merely for the trouble and cost of materials used in the preparation, as the bark itself is *not to be sold* at present. Should the bark be found to prove a valuable addition to our stock of bitters, it could soon be procured from Mexico and Peru in any desired quantity; meanwhile, I would invite the profession in Edinburgh to make trial of it, and shall feel much obliged if they will make the results of their trials known to me.

It appears to me, that one of the great wants in the medical practice of the present day is, a good light bitter of some real therapeutic powers. Most of the bitters in common use are harsh, disagreeable, and heavy, often exciting nausea, aggravating rather than allaying the irritability of a stomach already too irritable. To avoid these it has become of late too much the practice to employ quinine, bebeerine, strychnine, or other concentrated bitters or alkaloids, which in many cases do more harm than good. Satisfied I am of this, that in dyspeptic cases especially, by employing the alkaloids or bitter principle, separated from the aromatic, resinous, or other principles with which they are usually associated, we destroy to a great extent the therapeutic powers of the drug, and fail to derive those benefits which we should receive from making use of a spirituous extract, a tincture, or even the simple infusion or decoction of the drug. The warm aromatic principles, associated with the powerful bitter in the Copalchi, seem to me to supply the want of a light bitter, which most practitioners must have experienced; and it is to be hoped, that it will succeed in the hands of others as much as it has as yet done in mine.

It may be remarked, that the infusion and decoction of Copalchi are best made of the strength of half an ounce of bark to one pint of water. The tincture, with an ounce of bark to one pint of proof spirit. The dose of the infusion and decoction is a table-spoonful or small wine-glassful twice or thrice daily. Of the tincture, one or two tea-spoonsful, or of the extract from one to two grains, twice or thrice daily.

As Colpalchi bark yields freely much colouring matter, might it not be employed with advantage in dyeing? One, at least, of the crotons yields a valuable dye; and even the cascarilla itself is used in France as a dyestuff, yielding a rich black colour, which is easily fixed on stuffs little fitted for receiving fine dyes.

THE WATERS OF THE METROPOLIS.

(*Continued from Page* 419.)

3. *Lake or Pond-water.*—One only of the Water Companies—namely, the Hampstead Company, supplies this kind of water to the inhabitants of London. There are several small lakes or ponds in the neighbourhood of Hampstead, which are fed principally by springs, but partly by surface drainage, and these are the sources from which the company derive their supply of water. It will be observed, on reference to tables 1 and 2, that the total amount of solid matter contained in the water of the Hampstead Company is much greater than that of Thames water. The earthy salts, however, are nearly equal, so that there would be but little difference in the degrees of hardness in these two kinds of water; and, in regard to organic matter, that of the Hampstead Company has the advantage. This water is, no doubt, much more pure than it would otherwise be, in consequence of its being constantly drawn off from the ponds for use as fast as it is supplied from the springs and other sources. Were it not for this circumstance, it would be subject to the conditions which so frequently render lake or pond-waters impure; for, being more or less stagnant, they are less exposed to the purifying influence of the air than river-waters are;

while, at the same time, evaporation tends to augment the proportion of foreign matter present. From the long-continued action of these and other causes, the water of the Serpentine had, about twelve months ago, become so impure as to pollute the surrounding atmosphere. The subject was alluded to in this Journal, vol. viii., page 433, and also in the *Lancet*, since which time measures have been adopted for mitigating the evil, and we find that the Serpentine water is now comparatively pure. The composition assigned to it in table 2, relates to its condition before this improvement was effected, and when it was greatly contaminated with organic matter.

The waters of large lakes, especially if they be connected with rivers, by which circulation is constantly maintained, are frequently more pure than the waters of the rivers themselves, sufficient time and repose being afforded in the comparatively still water of a lake for the subsidence of impurities. The Bala lake, in North Wales, is celebrated for the purity of its waters. This lake, which is situated in Merionethshire, is four miles in length, and one mile in breadth, and it forms the source of the river Dee. Its water contains only about four grains of solid matter in the imperial gallon, and of this only one grain consists of earthy salts. It has been proposed to convey this water through pipes for the supply of London, the distance being only two hundred miles!

Well-water.—The well-waters of London vary to a considerable extent in quality, but they are generally considered to be good and wholesome as drinking-waters. We have to describe them, according to our arrangement, under the separate heads of Deep Well-waters and Shallow Well-waters.

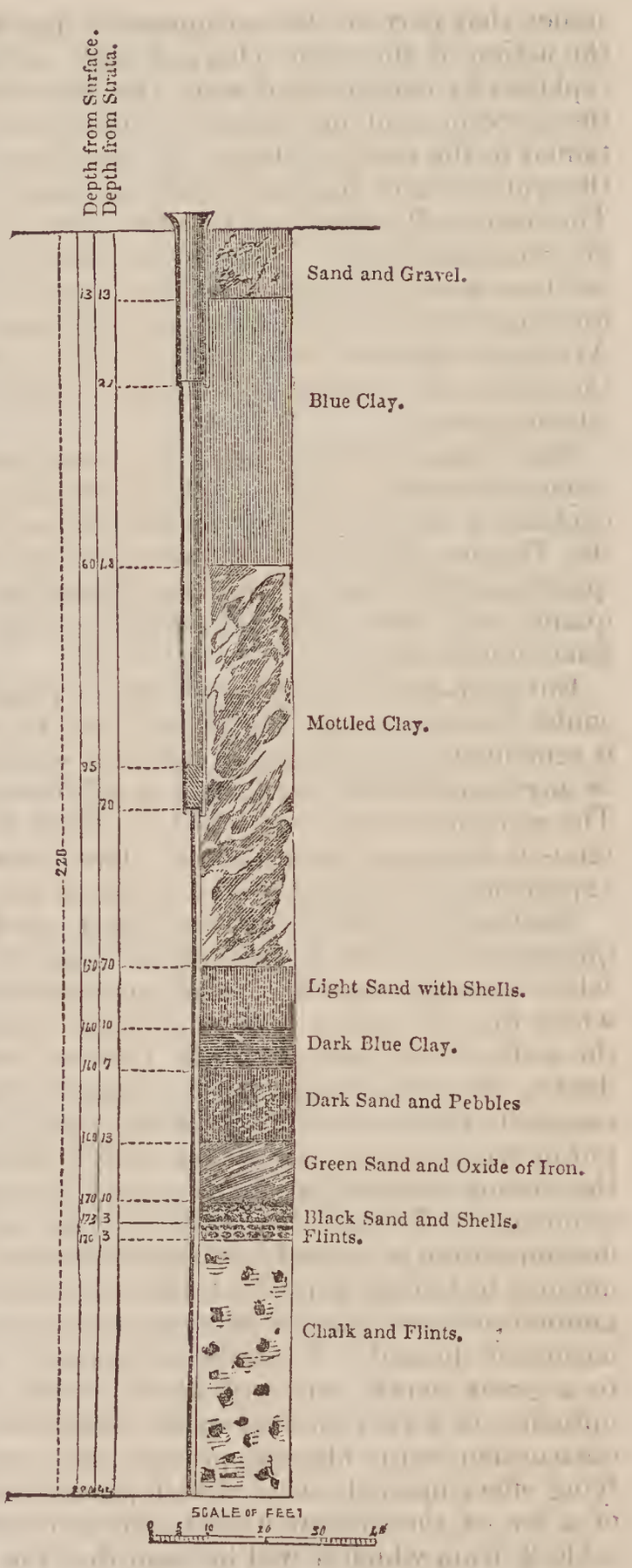
Deep Well-waters.—The practice of raising water from deep or Artesian wells is of modern introduction—at least, in this country. The term "Artesian" is said to have been derived from Artois, a province of France, where deep wells were first made; and the term is considered to apply to those wells in which perforations have been made through impermeable geological strata, so as to allow water from beneath to rise up towards the surface. Several wells of this description have been formed in London, by cutting through the clay and into the chalk, from which abundance of good water is obtained. The opinion is entertained by some persons that sufficient water could be derived from this source for supplying the whole of the metropolis—and this is, in fact, the basis of one of the propositions now before the public for improving our water supply.

It is universally admitted that the waters existing beneath the surface of the earth have found their way there by percolation from above, having been originally deposited on the ground as rain, or other condensed vapour.

This infiltration may have taken place from immediately above the spot at which the water is found, or it may have commenced at a considerable distance, being conveyed through fissures or porous strata, and in this case it is sometimes prevented from rising to its natural level by the superposition of an impermeable geological stratum. The deep well-water of London is found in the chalk, which at a depth of from 200 to 300 feet beneath the surface forms a bed of great thickness, extending under the whole of London and the surrounding country, and constituting what is called the London basin. None of

this water can be the result of infiltration from above, as there is a thick stratum of clay over the chalk, through which the water cannot pass. It is this bed of clay that prevents the water from rising to the level at which it may stand in those parts of the chalk basin which are nearer the surface of the earth than that over which London stands.

The drawing in the margin represents a section of the different strata cut through in the formation of an Artesian well at Mr. Webb's soda water manufactory at Islington.



There is an obvious advantage, in great cities, in having wells of this description rather than those of a shallower kind, which receive their supplies of water by percolation, from the surrounding neighbourhood, and are thus subject to many sources of contamination. But independently of this consideration, the water derived from the London chalk basin is better, for many purposes, than that obtained from the upper strata. It will be observed, on referring to table 2, that it contains a much smaller quantity of earthy salts than any of the river waters of London, and those that are present, and which would tend to give the water the character of hardness, are more than compensated for by the presence of carbonate of soda. It seems extraordinary, at first sight, that the water taken from the chalk, and which must have traversed a considerable extent of this stratum, should be less charged with calcareous salts than that which is found in the sand and gravel above it. This appears to arise from the circum-

stance that part of the carbonate of lime which is first dissolved by the action of the water charged with carbonic acid, is subsequently replaced by carbonate of soda, this salt being formed by the action of the carbonic acid on silicate of soda, a small quantity of which is contained in the chalk. Hence the carbonate of soda is only found in the waters which have traversed the chalk for a considerable distance. The deep-well waters of London, therefore, instead of being hard, are remarkably soft. They are also very free from organic matter; on these accounts they are well adapted for the use of laundresses, for general domestic purposes, and for many manufacturing processes. Artesian wells have been made at some of the large breweries, and in these and other similar cases, the alkalinity of the water is considered advantageous.

But although the London deep-well water is soft, and free from organic impregnation, it cannot strictly be called a pure water, for it contains a much larger proportion of saline matter in solution, than the Thames and some of the other London waters. It may be questioned whether, as a drinking-water, the phosphates, and the large quantity of other saline matter present, do not render it subject to some objection?

But even had the deep-well-water possessed all the qualities that could be desired, and it certainly has several recommendations, still it remains to be proved that sufficient water for the supply of London, or any considerable part of it, could be obtained from this source. The evidence hitherto adduced, far from supporting such an opinion, tends in the opposite direction. Even now, a difficulty is frequently experienced at some of the breweries in getting their required supply.

Shallow Well-Waters.—There is a much greater diversity in the quality of the shallow, than of the deep-well waters of London, their saline impregnations depending upon the nature of the stratum from which they are taken, and upon other local circumstances. Nearly all the wells of this description in London contain nitrates, resulting, no doubt, from the oxidation of decomposed animal matter. This is especially the case with those wells which are situated, as many of the public wells are, in, or near to, churchyards. It is thus obvious that the shallow wells of large towns may be greatly contaminated in consequence of their receiving by filtration some of the products of the decomposition of animal and vegetable matter, which necessarily accumulates in thickly populated districts. The extent to which this contamination takes place, will depend upon the depth of the well and the nature of the soil. A sandy or gravelly soil will admit of filtration to a great depth, and this kind of soil will exercise a purifying influence to a very limited extent, whereas clay offers a much greater obstruction to the filtering process, and exerts a more powerful purifying effect upon the water which passes through it. The composition of a few of the shallow wells in and around London, is represented in table 2, from which it will be seen that the proportion of earthy salts is much greater here than it is in the deep-well or river waters, and carbonate of soda is never found. But the waters of many of the shallow wells contain a larger proportion of solid matter than the analyses in the table indicate, and this is especially the case with the wells on the Surrey side of the river. The sand and gravel which cover the clay, as shown in the drawing, page 468, extend to a

greater depth in this part of London than on the north side of the river, and hence the wells are more exposed to the influence of infiltration. It is said, that when the public drains were first constructed in Lambeth, all the shallow wells became dry, the water being carried off by the drains, which were deeper than the wells. The owners of the wells were, therefore, compelled to sink them deeper, in order to get a sufficient supply of water, and the effect of this has been, that the drains are now dry, their contents filtering into the wells. Partly from this, and from other causes, the waters of the shallow wells of the Surrey side of London are very impure, containing often as much as 120 grains of solid matter in the imperial gallon. At Goding's Brewery in Lambeth, where there is both a deep and a shallow well, the water of the former was found to contain 50 grains, and that of the latter 110 grains of solid matter in the gallon.

Whilst admitting, therefore, that wholesome water is obtained from many, perhaps most, of the shallow wells of London, it cannot be denied that in some cases it is otherwise, and that in all cases, the waters taken from these sources are very hard and unsuitable for most domestic uses.

On reviewing the statements adduced with reference to the present condition of the different kinds of London water, it will be found that the river waters and the deep-well waters fulfil to a considerable extent the conditions required to render them suitable for alimentary and other domestic uses. Water raised from the chalk would certainly be preferable to unpurified Thames water, and in some respects, perhaps, to that which has been purified by filtration; but, whilst we are in ignorance of the extent of the resources of the artesian system, there is abundant evidence of the never-failing supply of the waters of the Thames.

There are two grounds of complaint against Thames water, especially when taken from any place within the influence of the tides: namely, that it is much contaminated with organic matter, and that it is not absolutely a soft water. We have designated it as a moderately soft water, for although it is hard as compared to rain water or to the deep-well water of London, yet it is very considerably softer than our shallow-well waters, and will bear a favourable comparison, in this respect, with most river waters.

The inconvenience and loss resulting from the presence of rather more calcareous matter than is desirable, are evils of less magnitude than those which might ensue from the introduction into general use of very pure water, such as that of the Bala lake. It is not many years since the attention of the public was directed to the poisonous effects produced upon Her Majesty's hounds by the water obtained from a well on Hounslow Heath, after running through a leaden pipe, and yet we believe that a project is at the present time under consideration for supplying London with water from that neighbourhood, the principal recommendation to the proposed plan being that the water is comparatively free from saline impregnation.

The objection to the use of Thames water founded upon its being contaminated with organic matter and receiving the drainage of London, might be removed by taking the supply from beyond the influence of the tides, and by adopting an efficient system of filtration.

This part of the subject is treated of in the succeeding article (page 474).

COMPOSITION OF THAMES WATER;

Representing the Quantities in Troy Grains of Solid Ingredients in 70,000 Grains, or an Imperial Gallon, of the Water taken from different Localities, and at different times.

	BEYOND TIDAL INFLUENCE.		WITHIN TIDAL INFLUENCE.							
	At Teddington, 1827, R. Phillips.	At Teddington, 1827, Dr. Pearson and Mr. Gardener	At Battersea, 1827, Dr. Pearson and Mr. Gardener	At Chelsea, 1827, Dr. Pearson and Mr. Gardener	Near London, 1828, Dr. Bostock.*	At Chelsea, 1846, Brande.	At London Bridge, 1846, Brande.	At Twickenham 1847, G. F. Clark.	At London Bridge, 1848, J. M. Ashley.	At Greenwich, 1849, E. T. Bennett.
Carbonate lime	14.8	10.69	13.37	12.5	10.71	16.5	16.4	12.759	8.116	14.399
Sulphate ditto.....	1.2	1.63	1.6	1.6	1.05	1.5	6.0	.450		
Chloride calcium.....	...	...	...	...	1.4	...	...	1.75	6.974	1.927
Carbonate magnesia.	...	...	...	...	...	...	...	1.027		
Sulphate magnesia..	...	...	...	...	...	...	...	...	...	.547
Chloride magnesium	...	.17	.25	.25	...	...	...	...	0.079	1.148
Sulphate soda	...	...	...	...	...	...	...	2.0	3.105	3.922
Chloride sodium.....	1.4	1.25	1.55	1.47	...	1.7	2.0	...	2.372	
Sulphate potash.....	...	...	...	...	...	...	...	.667	.269	1.371
Silica and ox. iron...	...	.12	.24	.37	...	...	...	.273	.123	.795
Organic matter	...	...	...	...	...	...	...	3.48	6.997	4.081
	174	13.86	17.01	16.19	13.16	19.7	24.4	22.406	28.035	27.890

* This analysis is less satisfactory than the others, the precise locality from which the water was taken not being known.

TABLE 2.

COMPOSITION OF LAKE AND WELL-WATERS OF LONDON;

Representing the Quantities in Troy Grains of solid Ingredients in 70,000 Grains, or an Imperial Gallon of Water.

	DEEP WELLS.			SHALLOW WELLS.				LAKE OR POND WATER.	
	Trafalgar Square (Abel and Rowney).	Coomb's Brewery (Graham).	Royal Mint (Brande).	Lambeth Workhouse.	Gt. Ormond Street.	Barnet.	Erith, Kent.	Water of Hampstead Water-Works, 1849 (J. Mitchell)	Water of the Serpentine in Hyde Park. (T. Savory)
Carbonate Lime.....	3.255	6.18	3.50	20.60	15.00	5.18	6.82	3.832	.603
Sulphate Lime	...	...	...	3.04	12.65	20.6	2.3	4.420	
Chloride Calcium	...	...	...	2.324					
Carbonate Magnesia...	2.254	1.08	1.50					3.408	.709
Sulphate Magnesia ...	. .	...	...	7.926	1.32	...	...		
Chloride Magnesium	...	...	..	...	...	2.96			
Sulphate Soda	8.749	24.25	13.14	14.190	4.68	5.66	10.12	4.811	2.097
Carbonate Soda	18.048	11.68	8.63		...	...		...	6.045
Chloride Sodium	20.058	12.74	10.53	2.5	7.89	12.82	5.16	17.758	5.180
Sulphate Potash	13.671	...	...	...	...	...	...	3.278	
Chloride Potassium ...	...	...	...	17.416					
Phosphate Lime	.034	.19	...	...	...	...	...	.276	2.100
" Soda	.291								
" Iron	...	.24	...	.485	...	.72		...	2.100
Silica	.971	.44	.50	.57	...	.16	.14	.285	.590
Organic Matter	.908							1.969	4.973
	68.23	56.80	37.80	69.051	41.54	48.10	24.54	40.037	22.297

COMPOSITION OF RIVER AND WELL WATERS,

Representing the Quantities in Troy Grains of Solid Ingredients in 70,000 Grains, or an Imperial Gallon of Water.

	RIVER WATERS.								WELL WATERS.	
	CLYDE at Glasgow. (Dr. Penny.)	LEVEN, a Tributary to Clyde. (Dr. Penny.)	SEINE. (Deville.)	RHINE. (Deville.)	GARONNE. (Deville.)	RHONE. (Deville.)	LOIRE. (Deville.)	DOUBS. (Deville.)	ARCUEIL Aqueduct at Paris.	DIJON.
Carbonate Lime	2.52	.5	11.609	9.511	4.524	5.534	3.374	13.397	12.958	16.133
Sulphate Lime.....	.26	.52	1.886	1.030	...	...	...	...	11.490	
Chloride Calcium ...										
Carbonate Magnesia	.72	...	.189	.350	.238	.343	.427	.161	.575	.266
Sulphate Magnesia ...	...	...	a trace							
Chloride Magnesium	.4	.66	...	...	...	...	...	.035	1.163	
Sulphate Soda	1.94	.39	...	.946	.371	.519	.238	.357	.378	.189
Carbonate Soda	...	...	...	...	.455	...	1.023		...	.147
Chloride Sodium	.54	.73	.862	.140	.224	.119	.336	.161	2.637	.224
Sulphate Potash	1.94	.39	.350	...	.533	...	...	...	1.410	
Nitrate Potash.....	...	...	...	.26 6	...	.280	...	.287	...	.189
" Soda.....	...	...	.659	...	...	.315	...	2.73		
" Magnesia ...	...	...	.364	...	...	...	...	...	3.998	
Earthy Phosphates...	.31	.18								
Alumina	.28	.32	.035	.175	...	.333	.498	.147	.371	.070
Oxide Iron	a trace	...	.175	.406	.217	...	.385	.210		
Silica.....	.28	.32	1.711	3.423	2.813	1.669	2.848	1.114	2.146	1.065
Organic Matter	.89	.45								
	7.86	3.75	17.840	16.247	9.585	9.082	9.437	16.142	37.126	18.283

ON THE PURIFICATION OF DRINKING-WATER.

Of the various important topics which have been brought under discussion in connection with the metropolitan water supply, not the least important is that which relates to the depuration of the water furnished by the several companies to the inhabitants of this great metropolis. We propose, therefore, on the present occasion, to take a general survey of the various possible methods of effecting the purification of water, and then to consider which of them are practicable and necessary to be adopted by the metropolitan water companies.

Water may be purified by *subsidation and decantation*, by *filtration*, by *ebullition*, by *distillation*, by *clarification* or *fining*, and by the *addition of certain chemical agents*, which effect a chemical change in the composition of the fluid. Of course some only of these methods are practicable on the large scale, but it appears to us to be desirable to examine the whole subject, and to notice those methods also which, though not applicable to public companies, have been, or still are, practised by individuals on the small scale.

1. *Subsidation and Decantation.*—The depuration of water is greatly aided by repose, by which various suspended or mechanical impurities are allowed to subside gradually, and from these the supernatant water is drawn off. Tanks, cisterns, and reservoirs become, therefore, important depurating agents. All the metropolitan water companies are provided with large deposit reservoirs in which this form of purification goes on; and most houses are supplied with tanks, cisterns, or water-butts, which may be regarded as deposit reservoirs on a small scale.*

The purification of water by subsidation and decantation is the simplest of all modes of depuration; but unfortunately it is a very slow one. M. Leupold states that the water of the Garonne, taken when the river is swollen, does not recover its natural limpidity by ten days of perfect repose. The coarser impurities very quickly subside; but the finer matters are deposited very slowly.

During the time that deposition is going on, the water is exposed to the atmosphere, and in consequence suffers some chemical change. The bicarbonate of lime, which it holds in solution, undergoes decomposition, half of its carbonic acid is evolved, and chalk or simple carbonate of lime deposited.

$$\underbrace{Ca\,O,\,2\,CO_2}_{\text{Bicarbonate of lime.}} = \underbrace{CO_2}_{\text{Carbonic acid.}} + \underbrace{Ca\,O,CO_2}_{\text{Chalk.}}$$

In this way the atmosphere aids in softening those waters which owe the whole or part of their hardness to bicarbonate of lime. The atmosphere, however, is a source of contamination, as well as of purification. This must be very apparent when we take into consideration the immense quantity and variety of foreign bodies, inorganic as well as organic, contained in it. Ehrenberg tells us that, exclusive of inorganic substances, he has detected no less than 320 species of organic forms (*Polygastrica*, *Phytolitharia*, *Polythalamia*, and soft vegetable

* Sir William Clay says, that there cannot be less than from 30,000 to 40,000 cisterns in the district supplied by the Grand Junction Water Company.

parts) in the dust of the winds; and it is obvious, therefore, that waters which are chemically very pure, would become contaminated by a prolonged retention in the deposit reservoirs.

By those who advocate the superiority of a continuous over an intermittent supply of water, the inconveniences and expence of cisternage have been forcibly pointed out; and it has been argued that by the adoption of a constant supply, the necessity of reservoirs in private houses would be got rid of. This, however, is a fallacy. Cisterns or other reservoirs would still be required, on account of the inevitable interruptions of supply arising from repairs to the mains and service pipes, alterations, extensions, and other causes. At the present time these are sufficiently numerous and annoying;† but they would in all probability be considerably augmented if the mains and service pipes were kept constantly charged; as the bursting of pipes from frosts would then be of more frequent occurrence; and the slightest repair to a service pipe would require the interruption of the supply to a street, or, perchance, to a district.

Moreover, in the cases of those companies which do not filter the water they supply, house cisterns are absolutely required as deposit vessels, as the water furnished is occasionally turbid and muddy, and quite unfit for immediate use. This statement applies to the New River Water, which is one of the best of the unfiltered Metropolitan waters. Although it is conveyed many miles by an aqueduct, which to a certain extent may be regarded as a deposit reservoir, and is afterwards allowed to deposit in the proper reservoirs at the company's works, yet at certain seasons, as after heavy rains, the water supplied by the company is very turbid, and does not recover its limpidity after two or three days retention in the house cistern.

2. *Filtration.*—This process has for its chief object the separation of the mechanical impurities of water; that is, of those foreign bodies which are suspended, not dissolved, in water. But under certain circumstances, filtration becomes a means of modifying the chemical composition of water. Between liquids and solids there exists that kind of attractive force commonly called *adhesion*, to which are due the phenomena of capillarity or capillary attraction; and under certain circumstances, this adhesive force is capable of overcoming a feeble chemical force, and thereby of effecting the decomposition of bodies whose constituents are held together by weak affinities. Practically, however, filtration is in most cases to be regarded as a mechanical process, by which physical and not any important chemical changes are effected.

The materials employed for the filtration of water are perforated plates of metal or stone-ware, unsized, or bibulous paper, flannel or cloth or other tissues, sponge, porous stone (filtering stone), charcoal (animal charcoal), and beds of sand and gravel.

On the present occasion we shall confine our attention chiefly to those which are applicable to the filtration of water on the large scale, namely, beds of sand and gravel; but we shall premise a few observations on the use of animal charcoal as a filtering material.

† The total number of interruptions which occurred in the year ending September 30, 1849, to the tenants of the Grand Junction Water Company was 2316, being an average of 6.34 per day, Sundays included. The average time during which the water was shut off was from half-an-hour to six hours, according to the character of the works required.

Of all the permeable substances used for the purposes of filtration, animal charcoal possesses in the highest degree the combined mechanical and chemical influence to which we have already referred. In addition to its power, in common with other filtering media, of removing suspended or mechanical impurities, it also abstracts from the liquid which permeates it, various dissolved bodies, and thus effects a change in the chemical composition of the fluid which traverses it. Thus it removes odorous and colouring matters, bitter principles, vegetable alkaloids, resins, tannin, and even metallic substances, from their solutions. By filtration through it the most stinking ditch-water may be deprived of its noxious odour and flavour; and highly coloured solutions, such as wines and brown saccharine liquids, are rendered colourless by it.

These important properties of animal charcoal have oftentimes led to its recommendation and use as a filtering medium for water; and accordingly it is introduced into many of the common domestic water filters. But its deodorizing and decolorizing power is soon lost, and in order to enable it to reacquire its former efficacy, it requires to be again burned. Sugar refiners are obliged to renew weekly the animal charcoal which they employ for the decolorization of brown syrups. So that when employed in water filters, animal charcoal requires renewal every week or two.

Of all known permeable substances, the only ones which present all the requisites of filtering media for water on a large scale, are sand and gravel. These are cheap, allow the rapid passage of water through them, and, when they have been previously well washed, communicate no impurity to the waters which traverse them. Their employment must have been suggested to man by the observation of the numerous limpid springs which arise in sandy and gravelly districts.

Their action is chiefly, if not entirely, mechanical. They possess little or none of that power of effecting chemical changes on the liquids, filtering through them, which, as we have before remarked, animal charcoal possesses in so pre-eminent a degree. Yet, unless several distinguished writers have grossly deceived themselves, sand is not entirely devoid of this chemical influence.

Wagenmann, for example, found that when vinegar is filtered through pure quartz sand, the first portion of liquid that runs through is deprived of almost all its acid, and the vinegar does not pass through unchanged until the sand has become well charged with acid. The same authority also states that potato-brandy diluted with water and filtered through quartz-sand, yields at first pure water, then a mixture of water and alcohol deprived of its fusel-oil, and, lastly, the original mixture unaltered.

Berzelius filtered a saline solution through a long tube filled with sand, and found that it ran out more or less completely deprived of salt.

Matteucci repeated Berzelius's experiment and confirmed his statement. He filled a tube about twenty-six feet long with sand, and filtered a saline solution through it, and he found that the density of the liquid introduced by the upper aperture of the tube was to that of the liquid escaping from the lower end as 1.00 to 0.91. But he observed that this difference of density was not always maintained; for after a certain time the saline solution becomes as dense at its

exit from, as at its entrance into, the tube; proving that the decomposition of the saline solution takes place in the first action of contact between it and the particles of sand.

But a still more remarkable result, the inverse of the one just stated, was obtained by the last-mentioned author with a solution of carbonate of soda. He filled a tube, nearly ten feet long, with sand, and filtered a solution of carbonate of soda through it; and he found that the density of the liquid at its entrance was to that at its exit as 1.000 to 1.005. In this case then the sand had deprived the solution of part of its water, and had thereby increased the gravity of the liquid which filtered through.

Assuming, however, the accuracy of all these reported observations, it cannot be doubted that, in a practical point of view, the efficacy of sand, as a filtering medium, depends on its mechanical, not on its chemical influence.

Domestic water filters are usually made of stone-ware, and usually contain a combination of filtering materials—such, for example, as sponge, sand, and charcoal.

The filter beds used by several of the metropolitan water companies consist of a number of layers of sand and gravel, resting on perforated drains or tunnels. They will be more fully noticed hereafter.

3. *Ebullition.*—Boiling effects the expulsion of air and carbonic acid from water. It decomposes the bicarbonate of lime; carbonic acid gas being given out, and chalk or simple carbonate of lime precipitated. The fur which lines the tea-kettle, and the incrustation on the interior of steam-boilers, are chiefly composed of chalk. Lastly, ebullition destroys the vitality of either vegetables or animals found in water.

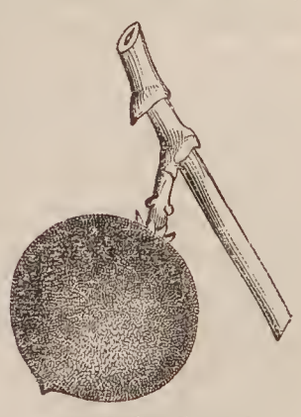
4. *Distillation.*—When properly conducted, distillation is the most effectual method of effecting the purification of water. But as it is manifestly not applicable to the purposes we have in view, it will not be necessary to enter into details respecting this mode of purifying water.

5. *Clarification, Clearing, or Fining.*—Under this head, we propose to notice certain methods of removing, from muddy water, those floating or suspended impurities which render it turbid or opaque. The methods in question are essentially mechanical processes, and are somewhat similar to the fining or clarifying processes used for wine and beer.

It is well known, that the finings used for beer and white wines are of a gelatinous nature; but for red wines, as well as for some other liquids, white of egg (an albuminous substance) is used.

In some semi-barbarous countries, muddy water is cleared or fined, and hereby rendered fit for drinking, by rubbing, the inside of the earthen vessel containing the water with some kind of seeds, and then putting it aside, so as to allow the impurities to deposit, and from these the supernatant clear water is decanted.

In India, the seeds of *Strychnos Potatorum*, or *Clearing Nuts*, are used for this purpose. The fruit of this plant is a shining berry, about the size of a cherry, and, when ripe, is black. It contains one seed, which is about the size of a cherry-stone.



Fruit of the Strychnos Potatorum.

"The ripe seeds," says Dr. Roxburgh, "are dried, and sold in every market, to clear muddy water. The natives never drink clear well-water if they can get pond or river-water, which is always more or less impure, according to circumstances. One of the seeds is well rubbed for a minute or two round the inside of the vessel containing the water, generally an unglazed earthen one, which is then left to settle. In a very short time the impurities fall to the bottom, leaving the water clear, and so far as I have been able to learn, perfectly wholesome. These seeds are constantly carried about by the more provident part of our officers and soldiers in time of war, to enable them to purify their water. They are easier to be obtained than alum."

Dr. O'Shaughnessy suggests that the clearing action depends on astringency in the fruit. But even if there were an astringent principle present, it would not account for the effect. We believe the efficacy depends on the presence of albumen and casein in the seed, which act as fining agents, like those employed for wine and beer. If the seeds be sliced and digested in water, a thick mucilaginous, ropy liquid is obtained, which, when boiled, yields a coagulum. If this be removed, a further coagulum is obtained, by the addition of acetic acid. These reactions show the presence of albumen and casein.

If this opinion be well founded, many other seeds ought also to have a similar influence; and this really appears to be the case. Thus we are told that, in order to clarify the muddy waters of the Nile, the natives of Egypt rub the inside of earthen jars, in which the water is kept, with almonds prepared in a particular manner. The water is then strongly agitated, and afterwards covered, and allowed to remain at rest for four or five hours, at the end of which time the impurities have subsided, and the supernatant clarified water is decanted.

Niebhur says bitter almonds are used; but Dr. Arcet states, that either bitter or sweet almonds may be employed. They are peeled, and made into cakes as large as eggs.

At Sennaar and Dongola, in Nubia, beans, haricots, and even castor seeds are also used for clearing the water of the Nile. We have no doubt that the efficacy of all these seeds in clearing water depends on the albumen and casein which they contain.

6. *The addition of Chemical Agents.*— This head includes several proposed methods of purifying water, which consist in the addition of certain chemical agents to this liquid, by which its composition is altered.

a. Addition of Alum.—In England as well as in France a popular method of clearing muddy water is to add a few grains of powdered alum to it (two or three grains are usually sufficient for a quart of water). This process our neighbours call the *alunage de l'eau;* and Arago states that when practised on the Seine water it causes the mud to agglomerate in long thick striæ which are very quickly deposited. The theory of the process appears to be this: the alum decomposes the bicarbonate of lime, and gives rise to the formation of sulphate of lime, which, with sulphate of potash, remains in solution, while carbonic acid is evolved, and hydrate of alumina being precipitated in a flocculent form, carries with it various mechanical impurities.

$$\underbrace{KO,SO_3+Al_2O_3,3SO_3}_{\text{Alum (dry)}} + \underbrace{3(CaO,2CO_2)}_{\text{Bicarbonate of lime.}} = \underbrace{6\,CO_2}_{\text{Carbonic acid.}} + \underbrace{KO,SO3}_{\text{Sulphate of potash.}} + \underbrace{3(CaO,SO_3)}_{\text{Sulphate of lime.}} + \underbrace{Al_2O_3}_{\text{Alumina.}}$$

This process then is a kind of mechanico-chemical one. It clears the water, but at the same time alters its chemical composition, and by converting bicarbonate into sulphate of lime augments the hardness of the water.

β. Addition of Caustic or Carbonated Alkalies.—Caustic alkalies added to water holding in solution bicarbonate of lime, saturates the excess of carbonic acid, throws down carbonate of lime (chalk), and leaves an alkaline carbonate in solution. If soda be the alkali used the results will be as follows:

$$\underbrace{CaO, 2\,CO_2}_{\text{Bicarbonate of lime.}} + \underbrace{Na\,O}_{\text{Soda.}} = \underbrace{Na\,O, CO_2}_{\text{Carbonate of Soda.}} + \underbrace{CaO,CO_2}_{\text{Chalk.}}$$

If an alkaline carbonate be employed all the earthy salts (calcareous and magnesian sulphates, chlorides, and bicarbonates), carbonates of the earths, are precipitated, while alkaline sulphates, chlorides, and bicarbonates which do not communicate hardness to water, are left in solution. If carbonate of soda be employed, its reaction on sulphate of lime and chloride of magnesium will be as follows:

$$\underbrace{CaO,SO_3}_{\text{Sulphate of lime.}} + \underbrace{Mg\,Cl}_{\text{Chloride of magnesium.}} + \underbrace{2\,(Na\,O, CO_2)}_{\text{Carbonate of soda.}} = \underbrace{Na\,O, SO_3}_{\text{Sulphate of soda.}} + \underbrace{Na\,Cl}_{\text{Chloride of sodium.}} + \underbrace{CaO,CO_2}_{\text{Carbonate of lime.}} + \underbrace{Mg\,O, CO_2}_{\text{Carbonate of magnesia.}}$$

γ. Addition of Lime.—A few years ago Professor Clark of Aberdeen took out a patent for the purification of water. His process consists in the addition of caustic lime to water; by which the bicarbonate of lime held in solution is decomposed: the caustic lime saturates the excess of carbonic acid, and forms carbonate of lime, which is precipitated.

$$\underbrace{Ca\,O, 2CO_2}_{\text{Bicarbonate of lime.}} + \underbrace{Ca\,O}_{\text{Caustic lime.}} = \underbrace{2\,(Ca\,O, CO_2)}_{\text{Carbonate of lime.}}$$

We believe Clark's process to be virtually impracticable on the large scale, while its efficacy is but slight.

It must be remembered that this process affects the bicarbonate of lime, not the more troublesome earthy salts, such as the sulphates and chlorides, on which the hardness of spring waters mainly depends. The difficulty of mixing lime and water, in definite proportions, on the large scale, must be obvious to every one. If too much be employed, the companies would supply their customers with lime-water! If too little, the bicarbonate of lime would not be completely destroyed, and the process would be a failure. Altogether the difficulties of carrying out the process are such that we believe it to be impracticable for water companies.

But the advantages of the process have been greatly exaggerated. The calculation of the patentee that, by the adoption of his process, the metropolis would annually save £63,000 (being ten per cent. on the estimated value of the soap and soda consumed) is, we believe, all moonshine. The washing of clothes, as practised by our metropolitan nymphs, is usually effected by hot, not by cold, water; and as by boiling, the same softening effect is produced on water which Professor Clark proposes to obtain by his patent process, the London washerwomen already adopt as good a process without the payment of anything for the use of a patent.

Lastly, the complaints made respecting the quality of the water supplied by the metropolitan companies apply to the organic matter chiefly, rather than to the earthy salts. For though Thames water contains on the average about fourteen per cent. of calcareous salts, yet the greater part of this is bicarbonate of lime, which by boiling is decomposed as explained above. Now, as in washing, brewing, tea-making, &c. the water is usually boiled before it is used, the inconvenience produced by the bicarbonate is but little felt; and the real complaints relate to the suspended or mechanical impurities, and to the dissolved organic matter.

δ. Addition of Oxalate of Potash.—Mr. Horsley, a respectable Pharmaceutical Chemist of Ryde, Isle of Wight, has taken out a patent for a new method of preventing incrustations in boilers, and also for purifying, filtering and otherwise rendering water fitter for drinkable and other purposes. When sea-water is employed for generating steam, he purifies it by employing oxalate of potash and ammonio-phosphate of soda; and the proportions which he employs for the water of the British Channel are about two drachms of oxalate of potash to about two ounces of the ammonio-phosphate of soda for every gallon. When his object is to purify and soften hard water he employs such substances as are capable of decomposing the calcareous salts, such as calcined or caustic baryta, or baryta water, phosphate of soda, silicate of potash, oxalic acid or the oxalates, and caustic strontia or strontia water; but he gives the preference to oxalate of potassa. He first ascertains the degree of hardness of water, and then adds the requisite quantity of oxalate of potash, by which an oxalate of lime is precipitated, and there remains in solution, instead of the lime thus displaced, a carbonate, sulphate of potash or chloride of potassium, as the case may be, and the water is purified and fit for use.

The following equation explains the reaction of oxalate of potash (we assume the salt to be neutral) on bicarbonate and sulphate of lime:

$$\underbrace{CaO, 2CO_2}_{\text{Bicarbonate of lime.}} + \underbrace{CaO, SO_3}_{\text{Sulphate of lime.}} + 2\underbrace{(KO, Ox)}_{\text{Oxalate of potash.}} = 2\underbrace{(CaO, Ox)}_{\text{Oxalate of lime.}} + \underbrace{KO, 2CO_2}_{\text{Bicarbonate of potash.}} + \underbrace{KO, SO_3}_{\text{Sulphate of potash.}}$$

Mr. Horsley's patent process does that which Professor Clark's fails to do: it decomposes all the earthy salts on which the hardness of water usually and mainly depends. But it is open to still greater objections than those that have been raised to the other method. Besides being like Clark's process virtually impracticable, it would prove very expensive, and as regards the metropolitan river waters it is quite unnecessary. Moreover the idea of "physicking" or "doctoring" the water by the addition to it of a poisonous agent, would, if even no other objection existed to this scheme, be quite fatal to it. For though in the hands of competent persons like Mr. Horsley, no possible injury could arise from its use, yet the public would always have some suspicion of water thus treated; and, as a celebrated English engineer observed to Arago, "*Water, like Cæsar's wife, should be above suspicion.*"

We defer the conclusion of this article until next month, when we shall give a description of the process of filtration on the large scale, with diagrams.

EXTRACT FROM THE REGISTRAR-GENERAL'S RETURN.

In our last number we took an exception to an inference drawn by the Registrar-General from a return of mortality from cholera in reference to the water supply, and observed that in order to give any value to such return, other circumstances ought to be taken into consideration. In the annexed diagram these circumstances are detailed, and the result confirms our previous impression. We attribute much importance to elevation in its influence on epidemics, and a comparison of the mortality from cholera on the north and south sides of the Thames, shows the result which might have been anticipated. We doubt whether the preponderance of density of population on the north side is as great as it appears in the return, as there is much land not built upon, south of the river. Where buildings exist they are of a smaller description, consequently the density is, in some places, greater than the average, north of the river. Without doubt the quality of the water exercises much influence on the health, and the water of the Thames below Battersea-bridge is, in its present condition, very unfit for drinking. This proposition should have its due weight in the scale.

DIAGRAM OF THE LONDON DISTRICTS.

The Diagram on the next page represents the relative position of the districts of London, and shows in a condensed form the results derived from previous data. The inhabitants of the *north side of the Thames* are, it will be seen, at an average elevation of 51 feet above the high-water mark, and, as respects density, in the proportion of 52 to an acre, 8 to a house; the houses averaging in annual value £46. Their water is supplied chiefly from the Thames above Battersea, from the New River, and the Lea. The inhabitants of the *south side of the Thames* are, on an average, only 5 feet above Trinity high-water mark, and, as regards density, in the proportion of 14 to an acre, 6 to a house; the houses averaging £25 in annual value. The money expended on the relief of the poor by the inhabitants of the north side was 12*d.* in the £1; by those of the south side 18*d.* in the £1 of house-rent. The water is chiefly from the Thames below Battersea, and from the Ravensbourne. The general mortality did not differ much on the north and south sides of the river; it was 251 annually in 10,000 inhabitants of the north, 257 in 10,000 inhabitants of the south side the Thames. The density is less in the Surrey districts of London, which have only this great advantage over their northern neighbours. The mortality from cholera was very different; it was 44 on the north, and 127 on the south side of the Thames in 10,000 inhabitants.

It will be observed that the value of houses decreases very regularly in the bands of districts proceeding eastward from Marylebone, Hanover Square, and St. Martin-in-the-Fields to Bethnal Green. Thus the average annual value of houses was in Hanover Square, £153; in St. James, £128; St. Giles, £60; Holborn, £52; Clerkenwell, £33; St. Luke, £28; Shoreditch, £20; Bethnal Green, £9.

	London.	North side of the River.	South side of the River.	
e	39	51	5	*Elevation* of the ground in feet above Trinity high-water mark.
d	30	52	14	*Density*, or number of persons to an acre, 1849.
i	7	8	6	Number of *inhabitants* to each house, 1841.
£	40	46	25	*Annual value in pounds* of houses, assessed to income-tax for year ending April 5, 1843.
p	13	12	18	*Pence* paid for relief of the poor to every £1 of house rent annually, 1842–43.
c	66	44	127	Deaths from *Cholera* to 10,000 persons living in 60 weeks, ending November 24, 1849.
m	252	251	257	Deaths from all causes annually to 10,000 persons (5000 males, 5000 females), living during the 7 years 1838–45.

DIAGRAM showing the DEATHS from CHOLERA in the Sixty Weeks ending November 24th, 1849, to every 10,000 Inhabitants in each DISTRICT of LONDON, and the ANNUAL MORTALITY from all Causes 1838-49; the WATER COMPANIES supplying each District; the AVERAGE ELEVATION of the Inhabited Parts of the DISTRICTS above the Trinity High-water Mark, as estimated by Captain DAWSON, R.E.; also the DENSITY of the POPULATION; the average ANNUAL VALUE of HOUSES; and the AMOUNT paid for the RELIEF of the POOR.

[ABBREVIATIONS.—*e* denotes elevation in feet of the ground above Trinity high-water mark; *c* the deaths from cholera to 10,000 living, 1848-9; *m* the annual deaths to 10,000 living 1838-44; *d* density of population (persons to an acre); £ the annual value of houses; *i* the inhabitants to a house; *p* the pence paid for relief of poor to every £1 of house rent annually; the capital letters denote the several water companies supplying each district.]

Abbreviations used in the Table.

H	Hampstead
WM	West Middlesex
C	Chelsea
GJ	Grand Junction
NR	New River
EL	East London
L	Lambeth
S	Southwark
K	Kent

Water Companies	*Sources of Supply.*
Hampstead .	By Springs on the Hill
West Middlesex	Thames, Hammersmith
Chelsea . . .	Thames, Battersea
Grand Junction	Thames, Kew Bridge
New River . .	Rivers Amwell and Lea
East London .	River Lea
Lambeth . .	Thames, Waterloo Bridge
Southwark . .	Thames, Battersea
Kent	Ravensbourne River and Deptford Common

LONDON.
e 30 £40
c 66 *i* 7
m 252 *p* 13
d 30

HAMPSTEAD.
e 350 £40
c 8 *i* 7
m 202 *p* —
d 6 —

†PADDINGTON.
e 76 £64
c 9 *i* 7
m 197 *p* 9
d 32 GJ

MARYLEBONE.
e 100 £71
c 17 *i* 10
m 227 *p* 10
d 101 WM

PANCRAS.
e 80 £41
c 23 *i* 9
m 222 *p* 10
d 60 NR. H. WM.

ISLINGTON.
e 88 £35
c 25 *i* 7
m 200 *p* 7
d 25 NR

HACKNEY.
e 55 £25
c 29 *i* 6
m 197 *p* 18
d 13 NR. EL

e 12
c 38
m 228
d 10
£33
i 7
p 9

†KENSINGTON, BROMPTON, HAMMERSMITH, and FULHAM.
WM. C. GJ

†HANOVER SQ. and MAY FAIR
e 49 £153
c 6 *i* 10
m 179 *p* 4
d 66 GJ

ST. JAMES.
e 43 £128
c 16 *i* 10
m 212 *p* 6
d 209 GJ. NR

ST. GILES.
e 68 £60
c 52 *i* 11
m 269 *p* 13
d 225 NR

HOLBORN.
e 53 £52
c 36 *i* 10
m 266 *p* 8
d 237 NR

CLERKENWELL.
e 63 £33
c 19 *i* 8
m 242 *p* 14
d 199 NR

ST. LUKE.
e 48 £28
c 36 *i* 8
m 276 *p* 19
d 200 NR

§SHOREDITCH.
e 48 £20
c 83 *i* 7
m 251 *p* 20
d 149 NR. EL

BETHNAL GREEN.
e 36 £9
c 95 *i* 6
m 239 *p* 33
d 108 EL

NORTH SIDE THE RIVER.
e 51 £46
c 44 *i* 8
m 251 *p* 12
d 52

CHELSEA.
e 12 £29
c 55 *i* 7
m 287 *p* 16
d 60 C

†BELGRAVE.
e 19 £67
c 31 *i* 8
m 194 *p* 4
d 61 C

WESTMINSTER.
e 2 £36
c 71 *i* 9
m 260 *p* 9
d 74 C

ST. MARTIN IN THE FIELDS.
e 35 £119
c 36 *i* 10
m 240 *p* 9
d 95 NR

STRAND.
e 50 £66
c 37 *i* 10
m 242 *p* 11
d 261 NR

WEST* LONDON.
e 28 £65
c 96 *i* 10
m 302 *p* 16
d 219 NR

LONDON* CITY.
e 38 £117
c 38 *i* 7
m 214 *p* 14
d 140 NR

EAST* LONDON.
e 42 £38
c 50 *i* 8
m 259 *p* 21
d 280 NR

WHITECHAPEL.
28 £26
c 71 *i* 8
m 290 *p* 18
d 198 EL

ST. GEORGE IN THE EAST.
e 15 £32
c 49 *i* 7
m 289 *p* 19
d 170 EL

STEPNEY.
e 16 £20
c 49 *i* 6
m 242 *p* 16
d 93 EL

POPLAR.
e 10 £44
c 90 *i* 6
m 241 *p* 14
d 15 EL

[WM] Source of Supply.

[C] Source of Supply.

THAMES.

Source of Supply. [S]

WANDSWORTH.
c 2 £29
c 111 *i* 6
m 198 *p* 17
d 4 S

Source of Supply. [L]

LAMBETH.
e 3 £28
c 115 *i* 7
m 233 *p* 17
d 39 L. S

ST. SAVIOUR.
e 2 £36
c 166 *i* 7
m 292 *p* 18
d 165 L.S

‡ST. OLAVE.
e 2 £35
c 183 *i* 8
m 281 *p* 19
d 159 S

BERMONDSEY.
e 0 £18
c 194 *i* 6
m 264 *p* 32
d 65 S

ROTHERHITHE.
e 0 £23
c 268 *i* 6
m 277 *p* 34
d 18 SK

GREENWICH.
e 8 £22
c 81 *i* 7
m 238 *p* 19
d 21 K

ST. GEORGE, SOUTHWARK.
e 0 £22
c 168 *i* 7
m 267 *p* 21
d 193 L. S

NEWINGTON.
e 2 below h. water
c 145 £22
m 232 *i* 6
d 102 *p* 18
L. S

CAMBERWELL.
e 4 £25
c 102 *i* 6
m 197 *p* 9
d 12 L. S

SOUTH SIDE THE RIVER.
e 5 £25
c 127 *i* 6
m 257 *p* 18
d 14

LEWISHAM.
e 28 £27
c 36 *i* 6
m 173 *p* 12
d 2 K

* The City of London, within and without the walls, is divided into three Unions for the relief of the poor, making three registration districts—the City, the West, and the East districts: in the West district is Bartholomew's Hospital, the deaths from cholera of persons belonging to the City have been distributed over each of the three districts.

† For Registration purposes Paddington is united with the sub-districts of Kensington, Brompton, Hammersmith, and Fulham, under the name of Kensington. The district of St. George, Hanover Square, comprises the sub-districts of Hanover Square, May Fair, and Belgrave.

‡ Including the deaths from cholera in St. Thomas's Hospital.

§ In Shoreditch is included the deaths from cholera in St. Luke's workhouse.

The deaths of several children who were removed from Mr. Drouet's establishment at Tooting, in the Wandsworth district, occurred and were registered in other districts of London.

In some few instances a *small* part of a district is supplied with water by other companies than those denoted in this diagram. In other instances the supply is imperfect, or by pumps or by ditches.

ON DRYING SPECIMENS OF FLOWERS.

BY MR. W. S. COLEMAN.

As the season for collecting plants is approaching, may I be permitted to give the particulars of the process I have adopted in drying specimens for the Hortus Siccus, especially the more delicate and succulent ones, for which I have found it peculiarly adapted, as it combines the greatest equality of pressure, with despatch in drying. My method is as follows:—The apparatus required is very simple, consisting of a few canvass or linen bags, of such size that, when laid flat, they will rather more than cover a sheet of demy paper, a quantity of clean sand, an old saucepan, or other convenient vessel, to heat it in, and a few quires of blotting-paper. Having provided these, first put a sufficient quantity of sand in the saucepan, over the fire, and, while this is heating, take a quire of blotting-paper, on which arrange the plants, covering them with two or three sheets of blotting-paper. When the sand is sufficiently heated, and uniformly so (which may be promoted by stirring it with a stick), pour into one of the bags enough to fill it to one-third. The mouth of the bag being closed, by tying or folding back, it is then to be laid carefully over the plants arranged between the paper, and the sand contained in it to be spread out by the hand, and pressed with a board, so as to form a flat uniform surface.

This process may be repeated, several layers of paper, plants, and sand-bags being laid on one another. If this is done, no extra weight will be required—the smallest and most delicate plants being placed in the uppermost layers; but if the subject be large and thick, a board and weight will be generally necessary.

Unless they are very thick and succulent, in which case they may require a second application of hot sand, the plants will generally be found quite dry within twenty-four hours, and often much sooner. This is one advantage; as, by this rapid desiccation, the colour is preserved in the greatest perfection—*i. e.*, if the temperature be well regulated. The second, and perhaps of more importance as regards the botanical value of the specimen, is, that the sand, by adapting itself to the inequalities of the object under pressure, prevents any crushing of the stems, receptacles, &c.; while the parts of the leaves in juxtaposition with a hard, thick stem, which, by the ordinary method, escape any pressure, and consequently shrivel up, are all equally flattened.

I am not aware that this method has been adopted at all generally, never having seen it made use of elsewhere, nor mentioned among the numerous published instructions for preserving plants, which is my motive for this communication, which I hope may in some instances be found useful; if it should not, I beg pardon for thus trespassing on your time and attention.

March 1*st*, 1850.

CORRESPONDENCE RELATING TO ADULTERATION OF SALTS OF MORPHIA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Princes Square, March 19, 1850.

Sir,—Having recently sent some muriate and acetate of morphia to Messrs. I. and J. Wright, of Holborn, Druggists, we were informed by

them that, on examination, they had been found to contain sugar ; in consequence of which we made application to them, on the 20th ult., to state the nature of the impurity, and upon whose authority that statement was made, which information Messrs. I. and J. Wright have declined to furnish. We shall be much obliged by your insertion of the following correspondence. We feel bound to adopt this course in our own justification, believing that public attention has been called to this matter.

COPY OF CORRESPONDENCE.

(No. 1.) 134, *High Holborn, Feb.* 21, 1850.

GENTS,—With this we beg to return the 4 oz. each of acetate and muriate of morphia, had from you a short time since. It has been examined at the College of Chemistry, and again here, and we find it is not pure.

We remain, Gents, your obedient Servants,
(Signed) I. AND J. WRIGHT.

Messrs. HEATHFIELD and Co., Princes Square.

(No. 2.) *Princes Square, Feb.* 25, 1850.

To Messrs. WRIGHT and WRIGHT.

GENTLEMEN,—Unless we have a distinct answer to our letter of the 20th instant, we decline to give you credit for the morphia you have returned. We may state that we have made inquiry at the College of Chemistry, and find that no efficient examination of salts of morphia has been made.

Your obedient Servants,
(Signed) HEATHFIELD AND BURGESS.

(No. 3.) *Princes Square, Feb.* 27, 1850.

To Messrs. WRIGHT and WRIGHT.

GENTLEMEN,—We must once more request to know if you object to inform us upon whose authority you state that our preparations of morphia are impure ; in the event of your declining to do so, it is our intention to make the matter one of public investigation.

Your obedient Servants,
(Signed) HEATHFIELD AND BURGESS.

(No. 4.) 134, *High Holborn, Feb.* 28, 1850.

GENTS,—In our last note we informed you that your morphia had been examined at the College of Chemistry, and again here ; since then we have had it examined by Mr. Morson, whose examination, as it regards the acetate, confirms what we have before stated.

We remain, Gents, your obedient Servants,
(Signed) I. AND J. WRIGHT.

Messrs. HEATHFIELD and BURGESS, Finsbury.

(No. 5.) *Princes Square, March* 1, 1850.

To Mr. MORSON.

SIR,—We enclose a copy of a note we have received from Messrs. Wright, and shall be obliged by your informing us, by return of post, whether you have examined any preparations of morphia for them ; and, if so, what is the nature of the impurity you have found therein.

Your obedient Servants,
(Signed) HEATHFIELD AND BURGESS.

(A copy of No. 4 enclosed with the above.)

(No. 6.) 19, *Southampton Row, March* 2, 1850.

Mr. Morson, in reply to Messrs. Heathfield and Burgess's note, informs them that he examined two samples of morphia salts at the request of Messrs. Wright, of Oxford Street, the purity of which he was informed is matter of dispute. He gave them the result of his examination, and must refer Messrs. H. and B. to them for further information, it being a question that does not concern Mr. Morson in any way.

(No. 7.) *Princes Square, March* 2, 1850.

To Messrs. I. and J. WRIGHT.

GENTLEMEN,—We request you to let us have a copy of Mr. Morson's report of his analysis of the preparations of morphia we forwarded to you, and which you declare to be impure.

We are, Gentlemen, your obedient Servants,
(Signed) HEATHFIELD AND BURGESS.

(No. 8.) 134, *High Holborn, March* 2, 1850.

GENTS,—We have already given our answer to your letter respecting the morphia ; and, since you refuse to take it back, we decline to go into further particulars. There is the article to speak for itself ; and, had you received it when sent to you, you might have furnished yourselves with the particulars, instead of giving us so much trouble in a matter where we should have had none. Your obedient Servants,
(Signed) I. AND J. WRIGHT.

We now request Messrs. Wright to state the nature and proportion of the impurity found on examination of the morphia at the College of Chemistry and by Mr. Morson. Your obedient Servants,
HEATHFIELD AND BURGESS.

TRIAL RESPECTING A NUISANCE.

NISI PRIUS COURT.—(Before Mr. Justice Erle and a Special Jury.)

JEWELL *v.* ETWALL AND ANOTHER.

Mr. Crowder, Mr. Barstow, and Mr. Beetham were counsel for the plaintiff, and Mr. Cockburn, Mr. Smirke, and Mr. Massey for the defendants.

This was an action of trespass for breaking and entering the premises of the plaintiff. The defendants pleaded that the plaintiff carried on a trade or business which was a nuisance, and they then justified under the Nuisance Removal Act.

It appeared that the plaintiff carried on the business of a bone-boiler and tallow-merchant, at Redbridge, in the neighbourhood of Southampton ; that he had a large furnace, in which he boiled all kinds of offal, putrid flesh, and putrid bones ; the liquor was thrown into tanks, and called liquid manure ; and the bones, having been so boiled, were ground in a mill, and sold for manure. The parties in the neighbourhood of the factory considered it to be a nuisance, and after some time the plaintiff was served with the different notices required by the 11th and 12th Victoria, chap. 123. He did not abate the nuisance, and the defendants, who were guardians of the poor of the parish, then issued an order to abate and remove the nuisance ; and under that order the parties went upon the plaintiff's premises, and seized the stuff in his furnace, and the bones and different articles which were alleged to be a nuisance, and carried them away. The act gave no appeal ; and, therefore, in order to try the right of parties to enter upon another man's premises in this manner, as well as to obtain compensation for the damage done, the plaintiff brought the present action.

The plaintiff's case was, that he had premises which were seventy yards from any human habitation ; that he carried on the business of a tallow-merchant ; and it now became a question whether he had a right to carry on that which he contended was a lawful business ; or whether any business which was noxious, although away from other houses, was to be put a stop to. On the 12th of September last, by the direction of the defendants, the plaintiff's premises were entered, and considerable damage was done by his goods being removed. In order to bring the case within the

statute, the business must be injurious to the health of other persons, which it was contended this was not. Witnesses were called who proved the trespass ; and then vast numbers of persons were put in the box, who stated, that this business, as carried on, was not noxious. Some, indeed, went so far as to say, that the odour emitted was not at all offensive, but was rather pleasant than otherwise.

For the defendants, it was contended that the business which the plaintiff carried on was extremely offensive ; that the effluvium completely poisoned the atmosphere, and, therefore, that it was one of those nuisances which the act was intended to put down ; and on that account the defendants were not only justified in what they had done, but would have neglected their duty had they not endeavoured to abate the nuisance. Many witnesses were called, who gave an account of the sort of stuff that was brought to the premises, which they described as being of the most filthy nature. Some of them said that the stench arising from the premises was so bad that it could be seen and felt as well as smelt. Some medical gentlemen said that such a trade was extremely noxious, and was injurious to the health of persons in the neighbourhood, even to an extent of a quarter of a mile ; that it had been found very pernicious in times of cholera, fever, and other diseases ; and that in the process of boiling, particles flew off, and mixed with the atmosphere. One gentleman said that the yards at the Penitentiary at Milbank were filled at times with the stench arising from the bone boilers' houses at Lambeth.

Mr. Justice Erle, in summing up, said the defendants had first pleaded "Not Guilty;" upon that there must be a verdict for the plaintiff. The defendants then alleged that the bone business was a public nuisance, detrimental to the health of the passengers in the highway, and that the defendants entered under the common law right to abate a public nuisance. He could not, by the evidence, find that there had been anything detrimental to the passengers on the highway. The defendants then put in a justification, founded upon the magistrates' order, under the statute of the 11th and 12th Victoria. He thought the effect of that Act of Parliament was, where premises were kept in so filthy a state as to be a nuisance or injurious to the health of any persons, or where there is an accumulation of offal, filth, or refuse so kept as to be a nuisance, and injurious to the health of the persons in the neighbourhood, it should be lawful for certain proceedings to be adopted, as had been the course in the present instance. The issue raised was, that the contents of the copper on the 12th of September were not the offal, filth, and refuse in manner and form alleged. He should therefore leave three questions for the jury:—1st. Were the contents of the copper on the 12th of September the same as on the 4th of September, being the day when the complaint was made ? In his opinion there were many cases of businesses which were in their course injurious to the health of the neighbourhood, where the filth was removed in the night of the day it was brought. If the order of the magistrates applied only to the very same actual rubbish on the premises as at the time of the complaint, a man might carry on his business in defiance of the Act of Parliament ; therefore it appeared to him the Act of Parliament warranted the construction that where there was a course of business from which there was the same deleterious result recurring daily, the magistrates would be authorized to order the removal of that course of business, and order the man to remove the pernicious matter, and, in default, to authorize a party to take it away. The second question would be—Was the cause of complaint arising from the bone-boiling substantially the same in kind and degree upon the 12th of September as it was upon the 4th? Thirdly, were the contents of that copper mere filth, offal, and refuse, so kept as to be a nuisance, and injurious to the health of a neighbour?

The jury retired, and returned a verdict for the plaintiff on all the issues.

This case commenced at ten o'clock on Monday morning, continued till past twelve at night, was resumed on Tuesday morning, and did not conclude till the afternoon of Tuesday.

INJURY BY AN EXPLOSION OF GUN-COTTON.

RHYS *v.* HALL AND ANOTHER.—At the South Wales Circuit Assizes, held on Friday, at Swansea, before Mr. Justice Williams and a special jury, the above case was tried. It was an action brought by the plaintiff, Mr. Rhys Hopkins Rhys, a young man of great scientific acquirements in the mining districts, against Messrs. Hall and Co., well-known traders in gun-cotton, to recover compensation for the loss of his sight through an explosion of gun-cotton. The damages were laid at £10,000.—It appeared from the evidence gone into that the plaintiff was invited by the defendants to witness divers experiments, with a view of showing the superiority of gun-cotton over gunpowder for blasting minerals and rocks. The experiments were tried in the limestone quarries near Dowlais, and, by the neglect and unskilfulness of the parties entrusted with conducting them, an explosion took place, by which the plaintiff and other persons were most seriously injured. The plaintiff, at the time of the accident, was in a fair way of realising an honest independence ; but, by the accident, notwithstanding that every remedy possible had been tried, and the most eminent occulists employed, became totally blind, and rendered quite helpless. From the evidence of Mr. Martin, a mineral agent, it appeared that several experiments had been successfully made upon small portions of rocks, when Mr. Wheeler, who acted as the agent for the defendants, and conducted all the operations, was asked whether there was not a larger hole to be had for trying a more extensive experiment. Upon this Mr. Wheeler tried to introduce a cartridge, containing 6lbs. of cotton, which was equal to 36lbs. of powder, into another hole, but could not. He then said he would cut it open, and put it in loose. Several persons asked him whether this would not be dangerous ; but he said it would not, and commenced forcing the cotton in with a stick. It was then rammed in by another person with an iron bar, when an explosion ensued, and all that were near were injured more or less. The plaintiff was standing close to the hole. If the cotton had not been taken out of the cartridge, no accident would have happened. Other evidence was produced to show that the experiments were not judiciously conducted.—Mr. Justice Williams, in summing up, left three questions for the consideration of the jury, viz.:—First, if the agency of Mr. Wheeler, who conducted the experiments, was proved against the defendants? and, secondly, if it was proved that the plaintiff attended by the invitation of the defendants? and, thirdly, if so proved, the amount of damages to which the plaintiff was entitled?—The jury found a verdict for the plaintiff. Damages, £1,500.—*Observer.*

PROPERTY IN QUACK MEDICINES.

KIRKUS *v.* TORR.

A CURIOUS case was tried at the York Assizes, last week, in which two chemists were plaintiff and defendant. The plaintiff is a Mr. Kirkus, of Liverpool, who married the sister of Mr. Torr, formerly of Doncaster, and the inventor of a family pill, sold with his name as "Torr's Pills," which was very generally patronised. The recipe was left to the sister, and her husband commenced manufacturing them. Mr. Atkinson, the defendant, afterwards became a manufacturer of "Torr's Pills"—and hence this action. Mr. Martin, for the plaintiff, described the virtues of the pills in glowing terms, summing up with the expulsion of a six-yard tape-worm. —Mr Baron Alderson: Red tape ? [*laughter*].—Mr. Martin also referred

to a wonderful cure of water scurvy, at Pontefract, which borough the learned counsel observed he had the honour to represent in Parliament. He concluded by recommending his learned friend on the other side to take one.—Mr. Baron Alderson: Perhaps the best way of deciding that part of the question will be for six of the jury to take half-a-dozen of the plaintiff's pills, and the other six half-a-dozen of the defendant's, and we shall see which six go out first [*laughter*].—Mr. Baron Alderson, examining the wrapper on one of the boxes, said he observed there was an advantage in taking three boxes at a time [*laughter*].—At the close of the plaintiff's case, Mr. Watson rose to address the jury for the defendant, contending that neither he nor the plaintiff had any property in Torr's Pills, and that therefore Mr. Atkinson had a perfect right to manufacture and sell them as he had done, not as Kirkus's Torr's Pills, but as Atkinson's Torr's Pills. And this was really the whole question. He had, therefore, no occasion to dispute the valuable properties of these pills.—Mr. Baron Alderson, in summing up, told the jury the question for their consideration was, whether or not the defendant had been selling these pills as and for the pills of Mr. Torr, manufactured by Mr. Kirkus, making people believe, and intending them to believe, that they were taking Kirkus's Pills, when, in reality, they were taking Atkinson's Pills.—The jury found their verdict for the defendant.—*Observer, March* 24.

BREACH OF COVENANT ON THE SALE OF A BUSINESS.

STERRIKER *v.* MATTHEWS.

We report briefly the facts of this case as a warning to purchasers of businesses.

Mr. Matthews, of Great Driffield, a druggist, soda water and lemonade maker, and dealer in miscellaneous articles usually sold by druggists in country towns, sold to Mr. Sterriker the whole of his business as a druggist, with soda water and lemonade trade, as at the time carried on in the premises, &c. &c. (excepting the sale of one article), receiving a large consideration for good-will, and agreed to promote as much as possible the interest of the purchaser. He further covenanted that he would not for a period of twenty years commence either directly or indirectly the said business of a chemist and druggist within thirty miles of Driffield.

About two years afterwards Mr. Matthews opened a shop nearly opposite the former one, and issued a list of articles sold, similar to the list he had previously issued in the other shop. The only difference between the two lists was this. The old list was headed "F. Cook Matthews, Wholesale Druggist (Medicine Warehouse), Great Driffield," and contained drugs, spices, paints, and miscellaneous articles. The new list is headed "List of Select Articles sold by Matthews and Co., Driffield." In this list the drugs, properly so called, are omitted; but the other articles constituting the collateral, and a very important part of the business, are included.

An action was brought at the York Assizes on the covenant not to commence business for a period of twenty years within thirty miles of Driffield. The plea put in by defendant was that the covenant only applied to the business of druggist, and that in his present list of articles sold the drugs were omitted. One of the witnesses for the plaintiff, when called upon to enumerate what he considered "drugs" on the list, pointed out almonds, arrow-root, mustard, sago, pearl barley, soap, &c. This produced laughter in court, and tended to damage the plaintiff's case. Another witness more discreetly stated that the articles on the list were such as were regularly sold by druggists—that in towns like Driffield, there were but few prescriptions, and the druggists were therefore compelled to extend their business to the other articles enumerated.

Equity was obviously on the side of the plaintiff, he having purchased a business, such as it was, and having paid a consideration in accordance with the estimated value of the good-will, which good-will was implied to include not merely the drug business in the strict meaning of the term, but the drug business as carried on in that particular shop, and as sold to the plaintiff. It appears, however, that the covenant in question merely mentioned the business of a chemist and druggist in general terms, without describing the nature of that particular business; and this omission turned the scale (not of justice, but of law) in favour of the defendant.

The jury recognised the injustice of the case, but found a verdict for the defendant on account of the defect in the terms of the contract.

We take this opportunity of adverting to another instance of hardship arising from neglect in the preparation of a similar bond. A chemist sold his business in a country town, and gave a bond under a large penalty not to carry on the business within a certain distance. About three years afterwards, the purchaser died, and his assistant succeeded him. The vendor, considering himself exonerated from his bond, commenced business about 300 yards from the old shop. He was not successful, and finding the feeling of the inhabitants not generally favourable, he disposed of his stock and good-will to a blacking-maker, who now styles himself Chemist and Druggist, and carries on the business in opposition to the successor of the former purchaser. The mistake in this instance consisted in the omission of the words "executors, administrators, and assigns," in the bond.

A LIBEL AGAINST A HOMŒOPATHIC DOCTOR.

OZANNE *v.* DE LISLE.

The *Guernsey Star*, of March 12, contains the report of an action for libel, brought by Mr. Ozanne, a homœopathist, against Dr. De Lisle, a physician. The charge against the defendant was, that he had said to plaintiff, in the presence of several witnesses, "You are no professional man; you are a quack and an impostor." The case having been argued at great length on both sides, the Bailiff (before whom it was tried), in expounding the legal bearing of the question at issue, said, "Had Dr. De Lisle confined himself to saying that homœopathy was quackery, and not applied the terms "quack" and "impostor" personally to the homœopathist, he would not have been liable to action. The opinion of the profession was declared to be that homœopathy was quackery; but if an individual took on himself to say that a person practising homœopathy was a quack, he made himself liable to an action, unless he proved his assertion."—The jury found a verdict of £5 damages to the plaintiff, an *ecu* (2*s*. 6*d*.) to the Queen, and costs.

CHEMICAL SOCIETY.

A very interesting paper was read before this Society on Feb. 18, entitled "Researches on the Organic Radicals," by Dr. E. Frankland. No. II. Amyl.—Iodide of amyl exposed in sealed tubes to a temperature of about 180° C., was acted upon by zinc with great difficulty; but by using an amalgam of this metal the decomposition was effected with considerable rapidity at 160° C. The products of this decomposition were iodide of zinc and a colourless pellucid fluid, which last, by distillation in a water-bath and subsequent rectification, was separated into two portions,

one boiling at from 30° C. to 35° C., and the other at 155° C. The latter was found to be perfectly pure amyl, yielding the formula C_{10} H_{11}. Amyl is a colourless pellucid liquid, possessing a slightly ethereal odour and a burning taste ; at 30° C. it becomes thick and oily, but does not solidify; its specific gravity in the liquid form is .7704 at 11° C.; that of its vapour 4.9062; hence it contains five vols. carbon vapour and eleven vols. hydrogen, condensed to one vol., and is thus, in this respect, perfectly analogous to methyl, ethyl, and valyl. Amyl boils at 155° C.: it is only inflamed by an ignited body, when previously heated, and it then burns with a bright smoky flame. It is insoluble in water, but miscible in all proportions with alcohol and ether. It is not affected by fuming sulphuric acid, and is only very slowly oxidised by boiling fuming nitric acid. The remaining volatile product of the decomposition of iodide of amyl by amalgamated zinc was found to consist of two bodies, having the empirical formulæ C_5 H_5 and C_5 H_6 ; but from the analogy of the first to the compounds belonging to the olefiant gas series, the author considers its true formula to be C_{10} H_{10}, and proposes for it the name Valeren ; whilst he regards the second as a compound of 1 eq. hydrogen with one eq. amyl, giving it the formula C_{10}. H_{11}. H, and the name Hydruret of Amyl. Valeren is a colourless and transparent liquid, possessed of a peculiarly penetrating and disagreeable odour, much resembling that of butyren. Its boiling point is about 35° C.; it is rapidly and perfectly absorbed by anhydrous sulphuric acid. Hydruret of amyl is a transparent, colourless, and exceedingly mobile fluid, possessing an agreeable odour resembling that of chloroform; it is the lightest liquid known, its specific gravity being only .6385 at 14-2° C. Hydruret of amyl is insoluble in water, but soluble in alcohol and ether ; it retains its fluidity at 24° C., and boils at 30° C. ; its vapour burns with a pure white flame of surpassing brilliancy and devoid of smoke; it is not in the least affected by fuming sulphuric acid; it is a remarkably stable compound, and is only acted upon with great difficulty by the most powerful reagents. The author thinks that hydruret of amyl exists in the most volatile portions of coal-tar, and that, by some simple modifications in the gas manufacturing process, this substance, which would be invaluable for illumination, might be procured in large quantities at a moderate cost. The occurrence of hydruret of methyl (light carbureted hydrogen) also leads him to expect that the intervening members of the series, *viz.*, hydruret of ethyl ; hydruret of butryl and hydruret of valyl, will be found in coal-gas, and that much of the illuminating power of that gas depends upon the presence of these compounds, the production of which, and their *non*-absorption during the purifying processes, must be a problem of considerable importance to the gas manufacturer. In addition to the bodies already described, iodide of amyl, when decomposed by zinc, yields zincamyl (C_{10} H_{11} Zn), a compound, having properties quite analogous to zincmethyl and zincethyl. The author's views on the rational constitution of the bodies belonging to these series are :—1st. That the radicals of the series to which methyl, ethyl, amyl, &c., belong, possess exactly the chemical character and relations of hydrogen, than which, however, they are less electropositive. 2nd. That these radicals can replace hydrogen in every combination in which this element plays the part of a simple radical, and is not enclosed in a group, while itself performs the functions of a simple body. 3rd. That the haloid compounds of these bodies may be regarded as hydracids, in which hydrogen has been replaced by one of these radicals. 4th. That the replacement of hydrogen in ammonia by these radicals, renders the assumption of the hypothetical radical amidogen superfluous. 5th. That these radicals, in addition to the property of combining with electronegative elements, possess also the faculty of uniting with hydrogen to form hydrurets.

NOTICES OF BOOKS.

THE DRUGGISTS' GENERAL RECEIPT BOOK; *comprising a copious Veterinary Formulary, a Table of Veterinary Materia Medica, numerous Recipes in Patent and Proprietary Medicines, Nostrums, &c., Factitious Mineral Waters and Powders, Perfumery and Cosmetics, Beverages, Dietetic Articles and Condiments, Trade Chemicals, &c. &c.* By HENRY BEASLEY. London: John Churchill. 12mo, pp. 424.

THIS work will be found to answer the purpose of many of our correspondents who are in want of veterinary formulæ, 142 pages being devoted to this subject. The Materia Medica, which comprises forty pages, contains a brief statement of the properties and doses of the remedies usually employed. This is followed by a collection of formulæ for horses, cows, calves, sheep and lambs, swine, dogs, poultry, and rabbits.

The next portion of the work will interest many of our readers, as it contains a great variety of nostrums, including the formulæ for some of the patent medicines in common use. The perfumery and cosmetics—preparations for skin, hair, and teeth, will also be found attractive. The beverages, dietetic articles, and condiments, trade chemicals, and miscellaneous preparations, comprise a variety of forms useful to the Chemist. In the Appendix there are several chemical tables also useful for reference. The book from its appearance might be taken for another edition of the Pocket Formulary, and there is a certain degree of similarity in its contents. Yet the two works are quite distinct. In the book before us, frequent reference is made to the Formulary which relates more especially to the preparations of the Pharmacopœias, British and Foreign, while the present work is of a more miscellaneous character, and equally useful to the Chemist and Druggist for reference, especially in the veterinary department.

REPORT OF THE COMMITTEE UPON HEALTH OF THE HON. THE COMMISSIONERS OF SEWERS OF THE CITY OF LONDON, *upon the Supply of Water to the City of London.* And

REPORT OF THE TRANSACTIONS AND WORKS EXECUTED BY THE HON. THE COMMISSIONERS OF SEWERS OF THE CITY OF LONDON, 1849. By WILLIAM HAYWARD, Surveyor to the Commission. Brewster and West, Hand Court.

TO CORRESPONDENTS.

Incognitus (Birmingham).—(1.) Any medicinal compound advertised for any specified disorders, whether in the newspapers, on handbills, or on the label, is liable to stamp duty.—(2.) A considerable quantity of nitric ether is obtained by distillation from the spirit used in making fulminating mercury.

Chemicus.—We cannot tell how the wholesale Druggists prepare the concentrated infusions, nor do we believe that such preparations can be made in an unobjectionable form to represent the infusions of the Pharmacopœia.

Juvenis.—Ferri Citras. See vol. i., pages 595 and 653.

Chemicus (Salisbury).—(1.) We are not acquainted with any modern Chemical Dictionary; but understand that Dr. Ure is engaged in preparing a very complete work of this description.—(2.) See Vol. vii., No. 7.

A Chemist's Assistant.—Hoblyn's Dictionary of Medical Terms.

J. G. E.—A dispenser of medicines cannot be qualified for the duties he has to perform unless acquainted with the nature, properties and natural history of the materials which are passing daily through his hands. This knowledge cannot be acquired without study.

W. W. (Stratford).—Any person who is now, or was prior to February, 1843, in business as a Chemist and Druggist on his own account, is eligible for admission as a member without examination.

E. J. G.—The examination by qualified persons in the country applies only to the classical examination of registered apprentices.

Gray.—The minor and major examinations of the Pharmaceutical Society can only be passed in London.

Quæsitor (Manchester).—For an explanation of the figures and symbols in the Diploma, see vol. i., page 264.

T. C. P. (Nottingham).—No licence is required for using a small retort for Pharmaceutical processes.

A Member (Enfield), will perceive that the substance of his suggestion respecting the sale of arsenic has been in principle adopted by the Council. See page 452.

Ejas.—(1.) The present number contains several articles of the kind required.—(2.) There are two opinions on this subject.—(3.) Candidates for examination may obtain their education at any school.—(4.) Rather too stringent.

A Druggist.—The subject of Sunday trading has been repeatedly noticed in this Journal, and sound practical reasons, founded on experience, have been assigned for not pursuing it any further.

Mr. Corder's letter has been received.

Lavatus.—We intend to advert to the subject next month.

The widow of Courtois, the discoverer of iodine, being in a state of destitution, a subscription has been opened on her behalf. Contributions are received by M. Claudet, 18, King William Street, Strand; Messrs. Hennemann and Malone, 122, Regent Street; and Messrs. Knight and Son, Foster Lane.

W. S. (Troubridge).—The crystalline substance obtained in distilling coal-tar naphtha is naphthaline.

Z. Z. (Portsmouth).—There is a formula for Proto Iodide of Mercury in the Pharmacopœia.

T. F. Amator Doctrinæ.—(1.) Ditartrate of Antimony, as this term is used by Mr. Phillips in his Translation of the Pharmacopœia, is represented by the following formula:—$Sb_2\ O_3 + C_4\ H_2\ O_5$.—(2.) Registered apprentices are not examined in Greek or French. At the minor examination the candidate is examined in Latin prescriptions, and sometimes in the Latin Pharmacopœia.

R. C.—A patent has been taken out in this country for coating iron vessels with the enamel alluded to; but we have not yet seen any apparatus thus coated for sale. We believe the patent is being, or about to be, worked at Birmingham.

A Constant Reader.—Morton's Manual of Veterinary Pharmacy is published by Longmans. We believe the price is 6*s.*

J. W. Ludlow.—The Superphosphate of Lime, which is used for agricultural purposes, is made by macerating two parts of crushed bones in a mixture of one part of oil of vitriol and three parts of water, for two or three days.

N. B. A., Plymouth.—Balfour's *Manual of Botany*.

M. P. S., Birmingham.—(1). Try nitrate of silver.—(2). *Green Ink.* Boil together a mixture of two parts of verdigris, one part of cream of tartar, and eight parts of water, until reduced to one-half, then strain.

A. P. S., Cheltenham.—There are two oxides of cobalt. The specimen sent appears to be protoxide. The sesquioxide is black.

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the Editor, 338, Oxford Street, before the 20th of the month (if Answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. IX.—No. X.—MAY 1st, 1850.

THE APPROACHING ANNIVERSARY OF THE PHARMACEUTICAL SOCIETY.

On the approach of the Ninth Anniversary of the Society, we again remind the Members that the present is the time appointed for the review of the proceedings of the past year. The Council will furnish their Annual Report, which will briefly state what has been done in furtherance of the several objects for the promotion of which the Society was founded. On each of the topics introduced into the Report, or connected with it, the Members will have a full opportunity of eliciting any information that may be required, approving or censuring the acts of the Council, and offering suggestions for consideration.

In every Society such periodical investigation is necessary, and the more searching the inquiry, the more free and candid the expression of opinion, the more effectually will abuses be rectified or prevented, and the prosperity of the Institution secured. However desirous the managers may be to perform conscientiously and efficiently the duties of their responsible office, the stimulus of an appeal to their constituents is a mutual advantage, affording at the same time the means of answering any erroneous impressions which may have been formed respecting their proceedings, and rectifying errors either of omission or commission, if any be laid to their charge.

The constitution of the Pharmaceutical Society is formed on the most liberal principles, two-thirds of the Council retiring annually from office, and the election by ballot being vested in the Members at the Annual Meeting. So long, therefore, as the Members watch over the interests of the Society, and attend on these occasions to exercise their privileges, they have the power in their own hands.

So far as we can judge, from an extensive correspondence with the Members, we have reason to believe that the influence of Pharmaceutical education, and the desire to raise the professional character of our body, are gaining ground, and that each succeeding year improves the position of the Society in the estimation of the profession and the public.

A few anonymous correspondents are dissatisfied, but their statements are in most cases founded on surmise rather than fact, and their objections admit of easy explanation. We only allude to this subject for the purpose of inviting all the parties concerned (whom we have no other means of addressing) to attend the Annual Meeting, where every facility will be afforded for impartial discussion.

MEDICAL CHARITIES.

The abuse of all charities is proverbial, and medical charities are not exceptions. The parish doctor, who is appointed to attend paupers, cannot always discriminate, and his services are sometimes obtained by persons not entitled to parish relief. Hospitals and dispensaries are established for the benefit of those who, although not

paupers, are nevertheless unable to obtain, by their own resources, the advice and medicines which they require. Among the applicants at these institutions are found not a few whose circumstances and situation in life are incompatible with the legitimate claims on charity.

To remedy this latter encroachment it has been proposed to establish self-supporting dispensaries, and this project has been warmly advocated in some of the medical journals as a means of protecting the profession against an unfair demand on their gratuitous services.

In most hospitals and dispensaries only the resident medical officers are paid—the Physicians and Surgeons constituting the honorary staff. According to the plan proposed, all the medical officers would receive salaries, and the funds would be chiefly derived from the subscriptions of the patients, either annually or at so much per case.

It is supposed that by this means justice will be done to the medical profession, and a medium will be established between gratuitous attendance and that which is regularly paid for. Those whose resources are slender would pay something, although not an equivalent, for the benefit received, and they would obtain medical advice instead of applying to Chemists for advice and medicine; and this, it is thought, would realise a moderate but fair remuneration to the profession.

At first sight the plan appears just and reasonable, but on reflection we are inclined to think that the result would be less advantageous to the profession than its advocates imagine. There are many persons too independent, or too proud, to become recipients of charity, who would not hesitate to avail themselves of an institution in which, by a payment however small, they established an apparent right to the benefit conferred. We say apparent, because, under any circumstances, the amount paid would not be an equivalent. The salaries of the medical officers would bear no just relation to their professional services, and must therefore be considered "below cost price." The drugs being purchased by tender on the lowest possible terms, would yield little or no profit to the druggist. Consequently the recipients of relief from such an institution would obtain advice and medicine at a rate which would afford no *remuneration* to the medical practitioner, the druggist, or the dispenser. As the "self-supporting" character of the institution would induce many persons to avail themselves of it under the idea that it was a "joint stock club," the natural tendency would be to divert into that channel those who would otherwise obtain advice and medicine in the regular way.

We have no wish to discourage legitimate and well-bestowed charity, and if there be any class of charities which deserve especial support, and in which an excess of liberality is admissible, we claim this indulgence on behalf of institutions which alleviate disease and suffering; but we maintain that whenever charity is bestowed there should be no mistake on the subject. Persons ought not to be deceived into the belief that they retain their independence because they pay a few shillings to an institution, the officers of which receive only a nominal remuneration for their services. Such a system would open the door to an amount of abuse the extent of which it would be difficult to estimate, and might undermine at the same time the independence of the receivers and the fair subsistence of the contributors of ill-requited services.

The proposed salaries to the medical officers might, in the first instance, be hailed as a just tribute to the profession; but even this advantage would be ephemeral. On the first vacancy occurring aspirants would not be wanting who would volunteer their services gratuitously, and the managers, by accepting the tempting offer, would be following the example of the managers of other institutions under similar circumstances. This is the root of the evil, if it be an evil to work for nothing. We might name at least a dozen medical charities where we have seen the innovation glide in. In one instance, at an infirmary in London, the office of Physician was vacant. The salary was £200 per annum, and the competition was so great that several candidates, in their eagerness to win, openly declared that the salary was "no object" with them. This was a bright idea for the directors, who saved the £200 a year, and appointed two Physicians instead of one on the terms which had been suggested to them during the contest.

We are, therefore, justified in the conclusion that the proposed system of self-supporting dispensaries would be a charity in disguise—a system of selling at a loss to persons who could afford to pay a fair price, and that the medical officers, while pretending to receive remuneration would, in fact, be acting like the Irishman, who passed a light guinea between two halfpence, the turnpike-man supposing that he had received only a penny, which was his due.

THE PATRONAGE OF HOMŒOPATHY.

On Wednesday, the 10th of April, two homœopathic dinners took place in the metropolis, one at the London Tavern, the other at the Albion. Lord Robert Grosvenor, M.P., presided at the former, the Earl of Essex at the latter. The object of these festivals was to collect funds for the establishment of homœopathic hospitals.

The homœopathic sect is divided into two parties, a feud having for some time past disturbed the harmony of the professors of globules, and resulted in an open rupture.

The Hahnemann Hospital, under the patronage of Lord Robert Grosvenor, and the London Homœopathic Hospital, under that of the Earl of Essex, are the undertakings now in contemplation, and the rivalry existing between the two cliques has given a temporary stimulus to the infinitessimal delusion.

The aggregate amount collected for these institutions was £2660, from which we may infer that the entertainment was not served up in homœopathic doses.

It is rumoured that one of the parties is in treaty for the extensive premises lately occupied by Messrs. Walter and Whitehurst, coach-builders, Oxford Street, within a few doors of the Royal College of Chemistry. This project, if carried into execution, will, without doubt, be popular among the poor. It will resemble a superior class of workhouse, where the inmates will be well-fed and housed without being troubled with physic. To those whose ailments arise from want and exposure, the treatment will be highly appropriate; and if a few should assume imaginary ailments as a means of escape from destitution, the average number of cures will increase, the fame of the hospital will rise, and the parish-rates will fall.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES
(*Continued.*)

ELECTED IN FEBRUARY, MARCH, AND APRIL.

MEMBERS.

BASFORD, NEW	Nightingale, Joseph S.	George Street
BIRMINGHAM	Southall, William	Bull Street
BRIGHTLINGSEA	Cooper, George Brown,	
BRIGHTON	Barnett, William	
BRISTOL	Fuller, James	25, College Green
EXETER	Ham, Charles H.	187, High Street
KIDDERMINSTER	*Wise, Thomas	Bull Ring
LEAMINGTON	Bond, Charles	6, Victoria Terrace
LEIGH	Bennett, John W.	Market Street
LONDON	Allchin, Alfred	27, Coles' Terrace, Islington
	Bird, Ash Rudd	2, Queen's Row, Pimlico
	Davenport, Edward	2, Lower Street, Islington
	Langdon, William	Walworth
	Large, John H.	2, Holt Place, Islington
	Lawson, William	36, Moorgate Street
	Lucy, William	29, Little Newport Street
	Stuart, John E.	172, Bond Street
LUTTERWORTH	Brown, Thomas	High Street
MACCLESFIELD	Bates, William I.	55, Mill Street
MANCHESTER	Stone, Charles Peter	Oldham Road
NORTHAMPTON	Merrick, Thomas	Bridge Street
OTTERY ST. MARY	Farrant, Henry	Silver Street
PENISTON	White, Luke Pearson	
SHEFFIELD	Wick, John	4, High Street
STOKESLEY	Weatherill, Lawrence,	Market Place
UPTON	Wilks, D. Tyers	High Street
UTTOXETER	Garle, William	Market Place

MAJOR EXAMINATIONS.

Fleurot, Emile	Mauritius
Wallworth, David	Congleton
Wilkinson, William	London

MINOR EXAMINATIONS.

Johnson, William G.	Jersey
Lamusse, Adolphe	Mauritius
Lever, William	London
M'Cree, William	Whitby
Martin, James	Plymouth
Parkes, Thomas	Knutsford
Pigou, Francis	London
Sims, John F.	Southampton

REGISTERED APPRENTICES.

APPRENTICES.	RESIDING WITH	TOWNS.
Anness, Samuel R.	Mr. Wick	Hadleigh
Arnold, William	Mr. Thompson	Thirsk
Bland, James I.	Mr. Stone	London
Blyth, William I.	Mr. Hurworth	York

Registered Apprentices (continued).

APPRENTICES.	RESIDING WITH.	TOWNS.
Bolton, Richard	Mr. Heming	Sunderland
Boughen, Hugh	Mr. Grimmer.....	Norwich
Breton, Walter	Mr. Evenden	Margate
Carter, Joseph.....	Mr. Dowman	Southampton
Coates, Edwin	Mr. Headley	Bridlington Quay
Coleman, William I...	Mr. Case.....	Norwich
Cutting, James	Mr. Cutting	Stowmarket
Drane, Robert	Mr. Smith	Norwich
Fitzhugh, Richard ...	Mr. Pooley	Bath
Greaves, James	Mr. French.....	Chatham
Green, Alexander A.	Mr. Markland	Yarmouth
Headley, William.....	Mr. Headley	Bridlington Quay
Hoskin, Edward H....	Mr. Albright	Liskeard
Levell, Alfred	Mr. Kershaw	Southport
Lough, Inglis	Mr. Tadman	Sittingbourne
Manthorp, George ...	Mr. Manthorp	Colchester
Musford, John.....	Mr. Ellison..... ...	Liverpool
Piercey, Frederick ...	Mr. Martin.....	Stonehouse
Pring, Walter	Mr. Cox	Taunton
Rowson, Henry	Mr. Davies.....	Chester
Searby, William M...	Mr. Martin.....	Guildford
Spasshatt, Samuel P.,	Mr. Tanner	Exeter
Tessier, William H...	Mr. Gordelier	Sittingbourne
Thomas, John	Mr. Pooley	Bath
Turner, Edwin	Mr. Bentley	London
Turner, William	Mr. Parker.....	Birmingham
Tylee, Charles A.....	Mr. Tylee	Bath

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Colquitt Street, Friday Evening, April 19, 1850.

ROBERT BAYLIS, ESQ., OF BIRKENHEAD, IN THE CHAIR.

Mr. H. S. Evans, F.C.S., read a paper on "The Elementary Organs of Plants." The author described, with the aid of some very beautiful diagrams (kindly furnished by Dr. Dickenson) the various organs distinguishing vegetable life, viz., cellulose, cellular tissue, pitted tissue, woody tissue, laticiferous and vascular tissue; he then noticed the various ducts, *i.e.*, the closed or spiral vessels, the acicular, and the articulated vessels, and concluded a very instructive paper by a general notice of the spurious elementary organs.

Mr. W. Johnson, F.C.S., of Birkenhead, then gave a lecture on "Fermentation," a subject which he handled with great ability. After referring to the general disposition of organic bodies to assume simpler forms, he pointed out more particularly the effect produced on such bodies by the presence of a substance in a state of change, the agent frequently taking no part in the changes which result.

He then pointed out the differences attributed by Liebig to the processes of putrefaction and fermentation; viz., that in the former case, the ferment itself undergoes change, and offensive odours are evolved, and that with the latter this is not the case, but this he believes to be a distinction without a difference, the processes being of a similar kind, differing from each other only in degree.

Mr. Johnson then described the phenomena of the fermentation of sugar. Yeast, he considered to be "gluten in a certain state of decomposition," its molecules being in such a state of motion and change, as to impart the same state to the body with which it is in contact. The lecturer next noticed the fact that the peculiar odour of a plant or flower

is communicated to and produced in a fermenting liquid, to an extent impossible by any amount of mixture with the odorous principle at another time. and thus the flavour of peculiar flowers is imparted to certain wines which are characterised thereby; and he further observed that it was probable that all odour arises from the gradual destruction of the odorous body, and that the gaseous principles evolved produce an excitement of the nervous membrane of the nose, which constitutes the sense of smell. As examples, oil of lemons is only odorous when exposed to the air, and musk is only odorous when damp.

The processes of putrefaction were next considered (generally characterising bodies abounding in nitrogen), which impart the change they are undergoing most readily to bodies similar to themselves in constitution. The action of bad meat on the human system is thus explained, and of the danger of wounds with instruments used in *post-mortem* examinations. The poisonous effect of the bite of a mad dog is probably due to a similar cause, and the injurious effects arising from eating muscles and other shell fish, which are liable to rapid change after death.

Mr. Johnson then referred to the effect of the same changes in vegetation. Thus a seed beginning to vegetate, it absorbs oxygen and water; and the *diastase* it contains slowly converts the starch of the cotyledons into sugar, which being soluble is absorbed by the young embryo, and the plant begins to grow. The same principle converts barley into malt, the sugar thus formed being converted into alcohol, carbonic acid, and water, by the further process of fermentation in making beer. The decomposition of amygdalin in contact with water into hydrocyanic acid and essential oil of almonds, was next noticed and illustrated, and the similar decomposition of mustard, horseradish, &c. referred to; and the lecturer concluded a very interesting and remarkably perspicuous lecture by a general review and support of Liebig's theory on the subject.

Mr. Edwards exhibited some "tinfoil paper" in the rough or unprepared state, in which the tin is precipitated as a dull grey powder; it is afterwards subjected to great pressure, by which the metallic lustre is brought out.

He also showed a dried plant of maranta arundinacea, with the rhizome attached, whence the arrowroot is procured.

He then acknowledged, on the part of the Society, the following donations:—

Rose's Analysis Braude's Manual of Chemistry	from Dr. Brett
Turner's Chemistry, 2 vols. Specimens of Jalapa " Ipomæa " Carthamine " Santaline " Cetine " Nitrate Strychnia	from Mr. H. S. Evans

He congratulated the Society on the success of the Laboratory Class, twenty-three young men having already joined it, and others being likely to do so; and announced that, at the next meeting, Mr. Johnson will resume the subject, with particular reference to miasm, contagion, infection, &c.

At a Council meeting, on Friday, the 19th inst., it was determined to open the laboratory for the use of Principals, one afternoon in each week, and to obtain the assistance of Dr. Brett to superintend processes, analyses, &c. according to the option of each individual. It is thought this arrangement will be very desirable for the detection of adulterations, trial of new processes, analyses, examinations of chemicals purchased, &c., which cannot be so conveniently attended to behind the counter, and it is hoped many will attend.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE ALCOHOL-TEST OF THE PURITY OF CASTOR AND CROTON OILS.

BY JONATHAN PEREIRA, M.D., F.R.S.

It is well known that both castor and croton oils are remarkable for their great solubility in alcohol, and on this property is founded the usual test for determining their purity and freedom from other fixed oils. For reasons presently to be detailed, I believe this test to be a very fallacious one.

I. When either castor oil or croton oil is mixed with alcohol, the two liquids exercise a mutual solvent action on each other. It is usual to speak of the solubility of castor or croton oil in alcohol, but the solubility of alcohol in these oils is not even alluded to in chemical and pharmacological works. Yet nothing is more easy to prove than that the solvent action is mutual.

Expt. 1.—Sixty-five vols. of English expressed castor-oil were mixed with sixty-five vols. of rectified spirit, sp. gr. 0.838. By shaking, an uniform, clear mixture was obtained. After several weeks, the mixture had separated into two strata; an upper spirituous one of twelve vols., and an inferior oily one of one hundred and eighteen vols. The supernatant spirit was found to contain oil in solution.

In this experiment, then, fifty-three vols. of rectified spirit must have been held in solution by the castor oil.

Expt. 2.—Eight vols. of pale or amber-coloured East India croton oil were mixed with eight vols. of alcohol, sp. gr. 0.796, and gently heated. In two days a separation had taken place; the oil now measured eight volumes and three-quarters, while the alcohol measured only seven volumes and a quarter.

In this case the croton oil had taken up three-quarters of a volume of alcohol.

The mutual action of these oils and alcohol appears to me to be similar to that of ether and water. If equal volumes of pure anhydrous sulphuric ether and water be mixed, the mixture on standing separates into two strata; an upper one, consisting of ether holding water in solution, and an inferior one, consisting of water, retaining some ether in solution. The separation of the two liquids by repose, is effected, partly by the difference of specific gravity, and partly by the force of cohesion acting between homogeneous particles.

In the case of spirit and either castor or croton oil, the phenomena attending the separation are of a very peculiar kind, and require further investigation. By mere shaking without any alteration of temperature, a perfectly clear, transparent, homogeneous liquid is obtained, which by repose becomes (often in a few seconds) cloudy, and in a few hours or days, a separation into two strata of liquids is effected.

II. The mutual action of alcohol or rectified spirit, and either castor or croton oil is not uniform, but varies with different samples of oil. At first I was inclined to ascribe this variation to differences of purity in the several samples of oil examined, but I am now convinced this is not the case; and that they depend on other circumstances. To Mr. Herring I am indebted for the means of establishing this fact, as he

has supplied me with authenticated specimens of East India castor and croton oils, and of castor and croton oils expressed in his laboratory.

Expt. 3.—Ten vols. of West India* castor oil were mixed with ten vols. of rectified spirit. By shaking, the mixture became clear and transparent. After a few minutes it was hazy, then cloudy and turbid. The tube was immersed in warm water; and the cloudiness disappeared. In eighteen hours the mixture had separated into two clear liquids; an upper spirituous one of three vols. and a lower oily one of seventeen vols.

Expt. 4.—Ten vols. of East India castor oil were mixed with ten vols. of rectified spirit. A cloudy or milky mixture was obtained, which no shaking would render clear; but by immersing the tube in hot water, the mixture became quite clear.

Expt. 5.—Ten vols. of English expressed castor oil were mixed with ten vols. of alcohol; by shaking a clear transparent mixture was obtained. After a few minutes a haziness began to appear, and in eighteen hours the mixture had separated into two strata, an upper spirituous one of two vols., and an inferior oily one of eighteen vols.

Of the three samples of castor oil examined the English expressed oil was more soluble in alcohol than either of the others.

Expt. 6.—One vol. of dark-coloured English expressed croton oil was mixed with one volume of alcohol sp. gr. 0.796 by shaking, without any additional heat, an uniform transparent mixture was obtained; and no separation took place on standing for several weeks.

In the case of the amber-coloured East India croton oil a separation takes place on standing, as already stated (See *Expt.* 2). Here then the solubility of croton oil in alcohol resembles that of castor oil, in the circumstance that both oils obtained by expression in London are more soluble in alcohol than the corresponding oils imported from the East Indies.

On what does this difference depend? Does it arise from the differences in the qualities of seeds pressed, or from differences in the mode of preparing the oil? On these points nothing definite can be stated. In the case of castor oil, the mode of preparation adopted in India is different to that followed in England. Here the oil is expressed in a warm room, and filtered.

An oil presser of Calcutta informed me that, in Calcutta, the expressed castor oil is heated with water, in a tin vessel, until the water boils, by which a scum forms on the surface, and that it is then strained. Dr. Ainslie, however, states that, in Southern India, it is prepared by decoction. In both cases, however, it is heated in boiling water; and it does not appear improbable that heat may effect some change in the oil, or the hot water extract something from it, by which its solubility may be lessened. With a view of elucidating this point, I made the following two experiments:—

Expt. 7.—Some English expressed castor oil was heated with water until the water boiled, and the ebullition was continued for several minutes; but no visible change was effected in the mixture. No mucilage, or scum of any kind, separated from the oil, which remained

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* I am indebted to Mr. Spencer, of Lamb's Conduit Street, for a bottle of this oil. He received it some years ago from the wife of the Governor of Tobago, on whose estate it was procured. Its colour is reddish.

as clear and transparent after the experiment as before. A portion of the oil, when cold, was mixed with an equal volume of rectified spirit, and the mixture shaken up; it in a short time became clear and transparent. The solubility of the oil had not, therefore, been appreciably effected by the boiling process.

Expt. 8.—Some English expressed croton oil was heated with water, until the water boiled, and the ebullition was continued for several minutes. No visible change was effected in the oil, and no scum of any kind separated from it. When cold, a portion of the oil was mixed with an equal volume of alcohol, and shaken up; no heat being applied. The mixture became clear and transparent, and no separation had taken place in it at the end of two hours.

As far, therefore, as these two experiments go, they negative the supposition, that exposure to the action of boiling water lessens the solubility of either castor or croton oil in alcohol or rectified spirit.

With the fact of the unequal solubility of different samples of apparently genuine castor oil in rectified spirit, I have long been familiar; but I am indebted to Mr. Redwood for the information that a similar difference exists between the foreign and English croton oils.

In the *Edinburgh Pharmacopœia*, a note is appended to the oil of croton, stating that, when agitated with its own volume of pure alcohol, and gently heated, it separates on standing, without having undergone any diminution. I have never been able to verify this statement. Genuine croton oil, expressed by the Messrs. Herring of London, forms, with an equal volume of alcohol, a perfectly transparent mixture, without being "gently heated," and does not again separate at ordinary temperatures. Mr. Redwood has verified the same fact with various samples of genuine croton oil, respectively expressed by himself, by Mr. Morson, by the Messrs. Herring, and by Messrs. May and Co., and he finds that no subsequent separation takes place, unless the mixture be subjected to artificial cold, as a freezing mixture, or to the atmosphere during a very cold night; and in that case the oil is found to have slightly increased in bulk, and the alcohol to have suffered a corresponding diminution of volume. I presume, however, that the statement of the Edinburgh college is intended to apply to the amber-coloured East India croton oil. This oil, when mixed with an equal volume of alcohol, does not form a transparent homogeneous mixture until a gentle heat is applied, and, on standing, the mixture separates into two strata—thus far agreeing with the statement of the Edinburgh college; but the oil, on separation, is found to have suffered a slight augmentation in bulk, and the alcohol a corresponding diminution (See *Expt.* 2).

In the degree of its solubility in alcohol, the pale or amber-coloured East India croton oil agrees with jatropha oil, and Mr. Redwood has suggested that it is perhaps mixed with the latter oil.

It is obvious, from what has been now stated, that if English expressed croton oil were adulterated with castor oil, alcohol would be useless as a test to detect the fraud.

Leopold Gmelin states, in his *Handbuch d. Chemie*, vol. ii., page 458, 1829, on the authority of Stoltze, that benzoic acid promotes the solubility of castor oil in spirit containing seventy five per cent of alcohol; and I have been informed that camphor is equally efficacious. I have not, however, verified either of these statements.

III. Castor and croton oils enable other fixed oils to dissolve in alcohol. This is a very interesting and important fact; and in illustration of it the following experiments are adduced. I may premise, however, that I have been accustomed for several years to demonstrate the fact in the lecture-room.

If rectified spirit be substituted for alcohol a gentle heat is usually required to render the mixture transparent and homogeneous; and on standing the liquid, when cold, separates into two strata, an upper spirituous one holding oil in solution, and an inferior oily one retaining spirit in solution. The relative bulks of the two liquids are, however, very different to those of the spirit and oil originally mixed.

Expt. 9.—One vol. of olive oil was mixed with two vols. of rectified spirit. When shaken the mixture remained turbid, and on the application of heat the two liquids separated apparently unchanged.

Expt. 10.—One vol. of olive oil, two vols. of castor oil, and two vols. of rectified spirit were mixed. The mixture remained turbid after shaking; but on the application of heat a clear transparent homogeneous liquid was obtained. After some hours separation took place.

Expt. 11.—One vol. of olive oil, four vols. of castor oil, and five vols. of rectified spirit were mixed; the phenomena were the same as in the preceding experiment. After some hours separation had taken place.

Expt. 12.—One vol. of olive oil, two vols. of castor oil, and three vols. of alcohol were mixed. By shaking they yielded a perfectly clear, transparent, and homogeneous mixture.

Expt. 13.—One vol. of lard oil (the olein separated from lard by expression) was mixed with one vol. of rectified spirit; after shaking the mixture remained turbid; on the application of heat the oil and spirit separated, apparently unchanged in quantity.

Expt. 14.—One vol. of lard oil, two vols. of castor oil, and two vols. of rectified spirit were mixed. The mixture remained turbid on shaking; but on the application of heat a clear, transparent, homogeneous liquid was obtained. After some hours, however, separation took place.

Expt. 15.—One volume of lard oil, four volumes of castor oil, and five vols. of rectified spirit were mixed. The mixture was turbid after shaking, but became clear, transparent, and homogeneous when heated. Separation, however, took place after some hours.

Expt. 16.—Sixty-seven parts of castor oil and sixty-seven parts of rectified spirit were mixed. By shaking a clear homogeneous mixture was obtained. In twenty hours no change or separation had occurred. Six vols. of lard oil were now added, and the mixture well shaken. In a short time, and without the use of heat, a perfectly transparent homogeneous mixture was obtained. On standing, however, fourteen vols. of a spirit, holding some oil in solution, separated.

Expt. 17.—Two vols. of English expressed croton oil, one vol. of olive oil, and three vols. of alcohol, were mixed together. By shaking, a transparent homogeneous mixture was obtained.

In other experiments, which I need not here enumerate, I find that castor oil enables nut oil (the expressed oil of *Arachis hypogœa*), jatropha oil (the expressed oil of *Curcas purgans*), and anda oil (the oil of *Anda brasiliensis*), to dissolve in rectified spirit.

The various facts now detailed seem to me to be best explained by supposing that both castor and croton oils contain some principle which confers on their fatty oil the power of dissolving in alcohol, and that this principle does not exist in all samples of these oils in the same proportional quantity, and hence the different samples are unequally soluble in alcohol. The same principle enables other fixed oils to dissolve in alcohol when they are mixed with either castor or croton oil.

Moreover, if we were further to assume that the quantity of this solvent principle, in both castor and croton seeds, increases the longer the seeds are kept, we should have a ready explanation of the greater solubility of castor and croton oils expressed in England, from seeds brought from India, and which are often musty, than of those oils expressed in India from fresh seeds.

In the *Edinburgh Pharmacopœia* it is stated that castor oil "is entirely dissolved by its own volume of alcohol." The statement is quite accurate; but if it is made as a guide to enable us to determine the purity of the oil, it is perfectly useless, for English expressed castor oil adulterated with 33 per cent. (or in some cases with 50 per cent.) of another fixed oil, is dissolved by its own volume of alcohol.

ON THE ADULTERATION OF ISINGLASS.

BY THEOPHILUS REDWOOD, ESQ.,
Professor of Chemistry and Pharmacy to the Pharmaceutical Society.

I HAVE recently been engaged in the examination of specimens of some of the isinglass now met with in commerce, which, from the price at which it has been sold, was suspected to be adulterated. The subject, previously to its being submitted to me, had been, to a certain extent, investigated by Mr. Warington, of Apothecaries' Hall, whose report to Messrs. Banks and Eland, of Bridge Street, Westminster, on two specimens, one of which was suspected, is as follows:

"*Apothecaries' Hall, April 8th*, 1850.

"Messrs. BANKS and ELAND,

"GENTLEMEN,—I have submitted the two samples of isinglass forwarded me on the 27th ultimo to a careful examination, and beg to report as follows:

"No. 1.—Hand cut, marked Simpson and Humphrey, appears to be a perfectly pure and genuine isinglass, yielding a very firm jelly of good colour and quite free from any unpleasant flavour or odour.

"No. 2.—Hand cut, marked Dawson and Morris, on the contrary, is, in my opinion, a very inferior article. It has a great deal of acid adhering to it, which, I consider, must arise either from acid having been used for the purpose of improving the colour and appearance of an inferior isinglass so as to render it saleable, or from its admixture with a gelatine which has been prepared by means of an acid; in either case imposing both on the dealer and the consumer. The jelly from this is firm and pretty good in colour, but it is acid, has a faint sickly odour, as though the material from which it was made had become slightly putrescent, and the flavour partakes of the same sickly character, which is very disagreeable. Trusting these results will prove satisfactory,

"I remain, yours respectfully,

"ROBERT WARINGTON."

The suspicion which had been entertained having been thus strengthened, and the nature of the adulteration indicated, it appeared very desirable to have more direct evidence upon the subject, not only with the view of proving a fraud which there was reason to believe was extensively practised, but, at the same time, to enable the dealers in isinglass to protect themselves and the public against imposition, and to exonerate those who have not participated in this newly-discovered branch of the system of adulteration which has become so general. With these views I undertook a few experiments, and although there has not yet been time to complete the investigation, I am induced to publish the results in the hope of their being practically useful.

Of the several varieties of isinglass, which, in the unmanufactured state, are imported into this country, that called *Beluga leaf* is most esteemed for dietetical use, and this, when prepared and cut, constitutes the best Russian isinglass of the shops. There are inferior varieties of Russian isinglass, such as the *Samovey*, which, being much cheaper than the Beluga, may perhaps be sometimes mixed with it when cut, but as the jelly made from such deteriorated specimens would be proportionately weak, the admixture would be thus detected.

Brazilian isinglass is a cheap kind, which is extensively used for fining beer and for other similar purposes, and this is also prepared and cut, like Russian isinglass, and is no doubt sometimes mixed with the Russian. The Brazilian variety, however, is much less soluble in water than the best Russian, and the jelly obtained from it is inferior in consistence, in transparency, and in flavour.

When these different kinds of isinglass have been submitted to the processes of the manufacturer, in which they are picked and purified (especially the inferior kinds), rolled into *ribbons*, and subsequently cut, the prices at which they are sold, wholesale, vary from six shillings to seventeen shillings a pound. The modern introduction of machinery has enabled the manufacturer to prepare the isinglass in much thinner shreds than was formerly the case when it was pulled to pieces by the fingers or cut with scissors. There are those, however, who still prefer to have it in the thicker pieces, in which state it is called *hand-cut*.

The quality of cut isinglass is estimated, 1st, by its colour, that which is cut fine by machinery being, *cæteris paribus*, the whitest and generally most esteemed; 2dly, by the smell emitted after breathing upon it, that being the best which is least disagreeable in this respect; 3dly, by the extent of its solubility in water; and, 4thly, by the consistence, transparency, and flavour, of the resulting jelly. This practical method of examination is that alone by which slight shades of difference may be discovered, yet a difference of flavour which only a practised palate, or careful comparison with an approved specimen, could detect, is often important in an article intended for the diet of the fastidious invalid, and a slight superiority in this respect, will, therefore, command a much increased price.

There is no substance that affords so pure and good a jelly as the best Russian isinglass; but gelatinous substances are obtained from other sources, and for several years past have been sold as substitutes for isinglass under the name of *gelatine*. The gelatines of commerce are prepared, either from the skins of animals, or from bones. The jelly made from some of these substances is nearly as firm as that made from

isinglass, and although it has more or less of a sickly flavour, sometimes strongly resembling that of glue, yet it must be admitted that the manufacture of gelatine, especially that made from bones, has been greatly improved, so that in colour, solubility in water, and gelatinising power, it is almost equal, although in flavour decidedly inferior, to the best isinglass. The sheet gelatine is sold, wholesale, at fifteen pence a pound.

Solutions of good gelatine, and those of isinglass, give similar reactions with the tests usually employed in the examination of gelatinous substances; it became necessary, therefore, to find some characters, other than those usually relied upon, by which to detect the presence of gelatine when mixed with isinglass.

Specimens of the best Beluga leaf and staple isinglass, uncut, from the museum of the Pharmaceutical Society, and others obtained from the house of Simpson and Humphrey, were used in determining the characters of this substance.

In making the corresponding determination with reference to gelatine, specimens were used of the cut and uncut gelatine, as met with in commerce, including Nelson's opaque and transparent gelatine, and the French gelatine, commonly called *grenatine*.

Action of water on isinglass and on gelatine.—1. If *cut isinglass* be macerated in cold water, it will assume an opalescent appearance, becoming more opaque than it was previously to its immersion. The shreds, although they swell and soften, will retain their integration. On examining thin slices under the microscope, they present the appearance of a fibrous structure. 2. If *cut gelatine* be macerated in cold water, it will assume a transparent appearance, this effect increasing with prolonged maceration. The shreds will swell up and soften, and ultimately become disintegrated. On examining a thin slice of the softened gelatine under the microscope, it does not present the appearance of a fibrous, but rather of a flaky, structure.

Action of solution of caustic potash on isinglass and on gelatine.—1. If *cut isinglass* be macerated in cold solution of caustic potash (liquor potassæ of the Pharmacopœia), it will speedily become transparent; and after the lapse of a few hours, if occasionally stirred with a glass rod, it will be dissolved, forming a clear and colourless solution. After allowing the solution to stand for some time, a *very slight* flocculent precipitate will be deposited, which, in operating on twenty or thirty grains of the isinglass, will be scarcely perceptible. 2. If *cut gelatine* be macerated in cold solution of caustic potash, it will become opaque; even those specimens which were so, to a certain extent, previously, will assume increased opacity after their immersion. The gelatine will ultimately dissolve, as does the isinglass, but the solution will not be transparent, and after standing for some time, a *copious* flocculent precipitate will be deposited.

Inorganic constituents of Isinglass and of Gelatine.—1. On carefully incinerating isinglass in a platinum crucible, an ash of a *reddish colour* is obtained, amounting to .5 per cent. ($\frac{1}{2}$ a grain in 100). This ash consists principally of carbonate of lime.—2. On incinerating gelatine, as above described, a *voluminous white ash* is obtained, amounting to .3 per cent. (3 grains in 100). This ash, like the former, consists principally of carbonate of lime. Three per cent. is the smallest

amount of ash obtained from any of the specimens of gelatine operated upon, but some specimens yield more.

Having thus ascertained that there are several characters, besides those of taste and smell, by which isinglass may be distinguished from commercial gelatine, I proceeded to examine a specimen of isinglass obtained from the same source as that referred to in Mr. Warington's report, and which was suspected to be adulterated.

1. A portion of the specimen was macerated in cold water. After standing for about two hours, the swelled and softened shreds were examined under the microscope with a low power, and they were found to consist partly of an opaque fibrous substance, resembling genuine isinglass, and partly of transparent flakes, resembling gelatine. In some of the pieces these substances were seen to form distinct strata, running parallel to each other; but in others they were more confusedly interstratified, or the strata completely broken, and only patches of the transparent part appearing here and there. In some of the pieces the separate strata could be distinctly seen with the naked eye.

2. Some of the specimen was macerated in cold solution of caustic potash. It became less transparent than genuine isinglass would be under similar circumstances. After allowing it to stand for some hours, it dissolved, forming a slightly turbid solution, from which a flocculent precipitate was deposited, which was much greater than that formed in genuine isinglass.

3. Some of the specimen was incinerated; it yielded an ash whiter and more voluminous than that of genuine isinglass, amounting to 1.5 per cent. ($1\frac{1}{2}$ grains in 100). This ash consisted principally of carbonate of lime.

It was evident from these results that the specimen under examination consisted of a mixture of isinglass and gelatine, and the optical examination showed that the two substances had been worked together in a manner well calculated to elude detection. I felt satisfied, and Mr. Warington had previously expressed the same conviction, that sheet gelatine had been rolled between two sheets of isinglass, in the moistened state, so as to form a ribbon, in which the two substances would be united.

In order to get further evidence in confirmation of this view, I applied to Mr. Vickers, proprietor of the house of Simpson and Humphrey, of Little Britain, who is an extensive manufacturer of cut isinglass, and who having been a sufferer from being undersold by the manufacturers of the adulterated article, expressed a willingness to render me any facility that his manufactory could afford for elucidating the subject. I accordingly had some genuine isinglass and sheet gelatine in the proportion of three parts of the former and one of the latter, rolled into ribbon and cut, under my inspection. The specimen thus prepared could not be distinguished by the eye from the best Russian isinglass. It agreed entirely with the adulterated article met with in commerce, not only in appearance, but in the characters presented when examined in the manner already described.

I feel fully justified therefore in the conclusion I have drawn, that a most ingenious but unwarrantable system of adulteration is adopted in the manufacture of cut isinglass, and I trust that this exposure will enable those who deal in isinglass to detect the imposition, if its practice should be continued.

THE PURIFICATION OF WATER.

(*Continued from page* 480.)

We have given a sketch, necessarily a very brief one, of the various methods of effecting the depuration of water. Of these different processes, subsidation and decantation are adopted by all the metropolitan companies; and of the remaining methods the only one which, in our opinion, is applicable on the large scale is *filtration*. This mode of depuration is adopted by three companies only, viz., the Chelsea, the Grand Junction, and the Southwark and Vauxhall Companies. The remaining six companies, namely, the New River, the East London, the West Middlesex, the Lambeth, the Kent, and the Hampstead Companies, supply unfiltered water to their tenants.

The water furnished by the West Middlesex Company is not filtered, but merely purified by subsidence. It is drawn from the Thames about a mile above Hammersmith, through a sluice, which is opened at certain times when the tide is favourable. It passes through a culvert, 580 feet long, into the first reservoir (1617 feet), thence through another culvert (430 feet) to the second reservoir (1477 feet), from the other extremity of which it is conveyed by a pipe under the Thames to the works on the other side. The time allowed for subsidence depends on the state of the water. During the floods, which occur after heavy rain, the river is more or less turbid, and on these occasions the water is retained for several days in the first reservoir. At other times it passes gradually from the source to the outlet. The level of the bottom of the reservoirs is eighteen inches below low water mark. The deposit reservoir is cleansed by flushing backwards from the second reservoir into the Thames at low water.

From the works the water is pumped into a reservoir at Kensington (105 feet above the level of the works), and for high service to Barrow Hill (170 feet), where the level is raised thirty feet higher by means of a stand pipe.

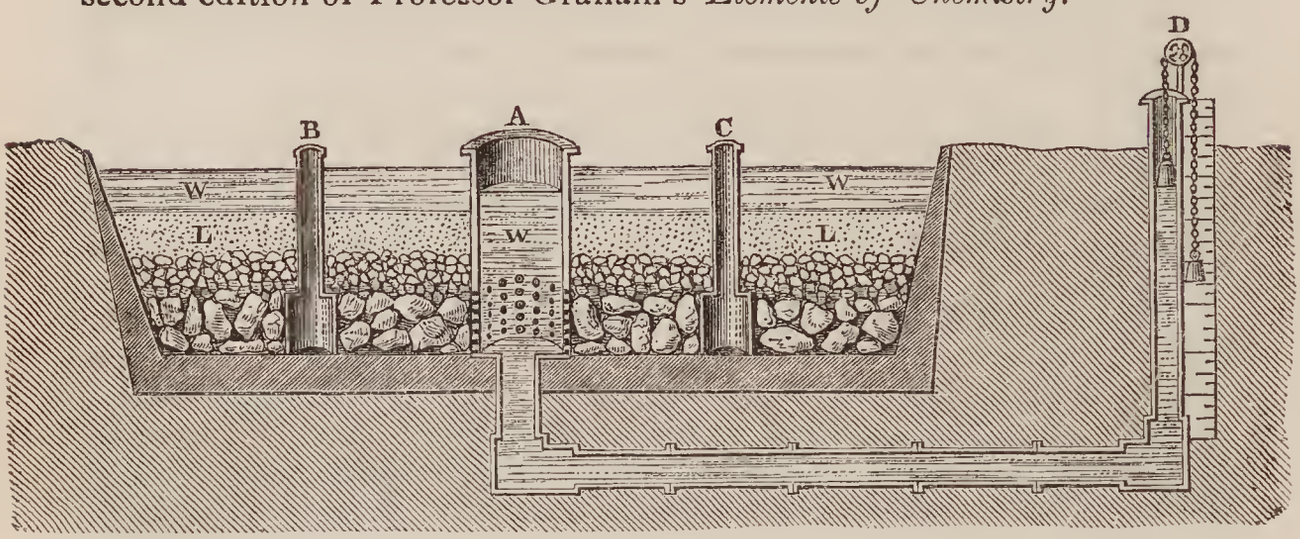
We are informed that the company does not filter the water, because it is believed to be unnecessary; but in the event of that process being required by Act of Parliament, or by the force of public opinion, facilities exist for its adoption. While we cannot dispute the fact, that this water, at its source, is apparently as pure as the water after filtration at Battersea, we doubt whether the public will ultimately be satisfied with any unfiltered river-water.

The supply of the Lambeth Water Company is taken from the Thames at Waterloo Bridge, where the traffic of steamboats, stirring up the sewage liquor which is flushed into that part of the river, gives the water—especially at low tide—the appearance of broth. The suction pipe requires frequent cleansing from the mud which accumulates in it; and the water, with no purification, except a partial subsidence in a reservoir, is supplied to the public. A reform, however, is about to take place, the company having obtained power, by Act of Parliament, to take their supply from the Thames at Ditton. The works are in rapid progress, and, when they are completed, the water,

of that company will be as good as that of any other in the metropolis, if not better.*

Believing, as we do, that filtration will ultimately, either by legislative enactment or by the force of public opinion, be adopted by all the metropolitan water companies, we propose to give a sketch of some of the present modes of filtration on the large scale.

Filter Beds.—The following account of the water-filter, as it is usually constructed for public works in Lancashire, is taken from the second edition of Professor Graham's *Elements of Chemistry.*



"An excavation of about six feet in depth, and of sufficient extent, is lined to a considerable thickness with well-puddled clay, to make it water-tight. Upon the clay floor is laid, first, a stratum of large stones, then a stratum of smaller stones, and, finally, a bed of coarse sand or gravel, LL. To allow the air to escape from the lower beds, small upright tubes, open at both ends, B and C, are inserted in these beds, and rising above the surface of the water, W W. The filtered water enters from the lowest bed into a large open iron cylinder, A; the lower part of which is perforated for that purpose. The filtered water stands at the same height in the gauge tube, D, as in A. This height is observed by means of a float, balanced by a weight, which traverses a scale of feet and inches at D."

The Southwark and Vauxhall Water Company is required, by the Act of 1834, 4 and 5 William IV., cap. 79, to filter the water they serve, prior to delivery. The water is taken from the Thames at Battersea, is carried into a depositing reservoir, and,—experience having shown that deposition is more conveniently effected when the depositing area is so arranged, that the water has to pass over a lengthened space,—is taken out at the remotest point from that at which it was received. From the depositing reservoir, the water is admitted into the filtering reservoir.

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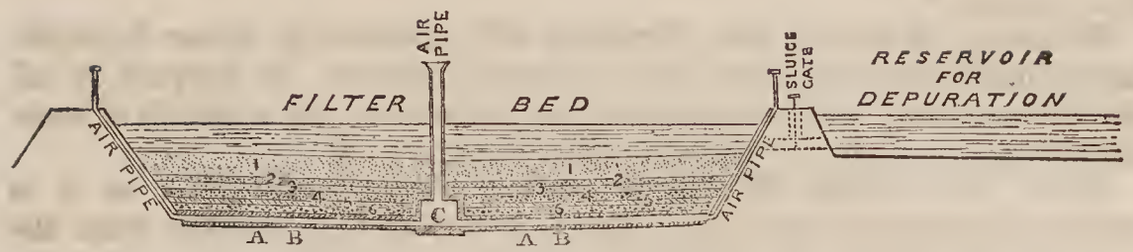
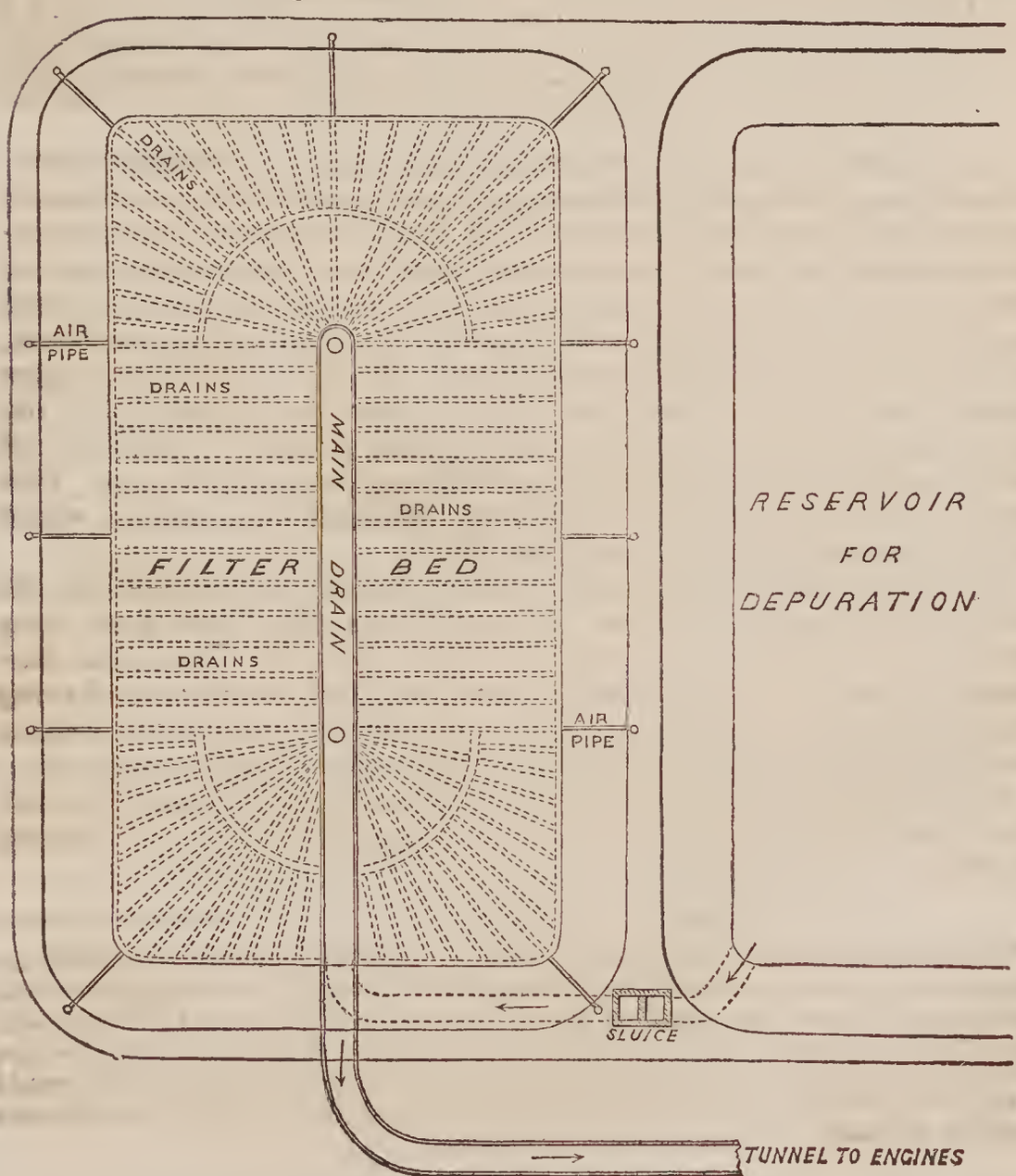
* Since the above was in type, we have heard a rumour that these operations are suspended, on account of a plan lately proposed for diverting the sewage which now pollutes the Thames, into another channel, which plan it is supposed will supersede the necessity for going higher up the river for a supply of water. If the Directors should be so ill advised as to delay the projected reform on such grounds, there would be but little prospect of reform in that Company, and some legislative interference would be necessary. To pause is to be undone.



The filter bed consists of the following layers of sand and gravel, resting on perforated tunnels or drains:—

A B The drain pipes. C The main drain.

1. Washed River Sand	2	feet	6	inches.
2. Fine Gravel	0	,,	9	,,
3. Small Screened Gravel	0	,,	9	,,
4. Large ditto	0	,,	9	,,
5. Shells	0	,,	2	,,
6. Large Gravel	0	,,	9	,,
7. Perforated Tunnels, or Drains for receiving Water				



The smaller perforated tunnels receive the water from the gravel, and convey it to the main drain, from whence it passes to the engine

tunnel. The air tubes communicate with the drains. The water taken by this company from the Thames, at Battersea, would be quite unfit for use without filtration; and even with all the care bestowed upon this process, it must be acknowledged that the source is highly objectionable. When received into the deposit reservoir from the Thames, it is turbid and discoloured, from the organic matter held in suspension; and, although after subsidence and filtration, it comes out bright and clear, the evidence of what it is, cannot dispel from the mind the recollection of what it so recently was. The great difference between these two states affords satisfactory proof of the efficacy of the process adopted; but it does not prove that Thames water, at Battersea, is unobjectionable under any circumstances, as it cannot be supposed that the mechanical process of filtration removes all the impurities, a portion of which, being in solution, are not so easily separated.

The filter-bed of the Grand Junction Water Company, at Kew, is four feet in thickness, and rests on a series of brick drains. It consists of:—

1. Fine sharp Sand	1	foot	6	inches.
2. Coarse sharp Sand	0	„	6	„
3. Small Shells	0	„	1½	„
4. Gravel that has passed through a screen of an inch mesh	0	„	9	„
5. Gravel that will not pass through an inch mesh	0	„	6	„
6. Rough Gravel that will not pass through a screen of 2-inch mesh	0	„	7½	„
7. Drain Pipes				

The construction of the Grand Junction Filtering Reservoir is similar to that of the Southwark Company, excepting the drains, which are of brick instead of tiles. The filter-bed at Kew is in six compartments, one of which is cleansed every week, the sand, to the thickness of from one to three inches, being removed, washed, and replaced. The washing is effected by placing it in a large box or tank, and admitting a stream of water by a pipe from below, which stirs up the sand, and flows over the top, carrying with it all the impurities. At first, the water is extremely thick and discoloured; but, in the course of a few minutes, it becomes quite clear, and the sand being thus cleansed is replaced on the filter-bed.

The deposit of mud after the filter has been six weeks in use, is not more than from an eighth to a quarter of an inch in thickness. By this time the coating of deposit offers considerable obstruction to the passage of the water, although the sand is discoloured only to the depth of about an inch, and never more than three inches below the surface. In proportion as this obstruction increases, more water is admitted to increase the pressure. Mr. Simpson, alluding to a filter recommended by Mr. Telford, for purifying the water of the Clyde, observes, that this consists of a series of cells filled with sand, the water passing through them in succession, and that, after passing through the first cell, little more is accomplished.* He states that this filter is not effective during floods, or when the water of the Clyde holds

* From which it appears that increasing the thickness of the filter-beds adds to the obstruction but does not increase the purity of the water. This is confirmed by our own observation.

in suspension the colouring matter from the peat masses; but he has seen the Clyde water filtered until it was perfectly bright, by conducting the process very slowly, the rate of motion not exceeding half an inch per hour. Precipitation on the sand evidently took place, which he has in some instances accelerated by the previous admixture of alumina or pipe clay, and other materials.*

In order to obviate the expense and inconvenience of cleansing the filters, *self-cleansing filters* have been contrived. One of these has been constructed by Mr. Thom, at Paisley. The cleansing is effected by altering the course of the water, allowing it to enter below, by which it fills all the drains, and having a head pressure of several feet forces its way upward through the sand to the top, and in its passage raises the scales or particles of mud which have been deposited in the downward passage and carries them into the foul-water drain below. Mr. Thom's filter cost £600, and, it is said, produces on the average 106,632 cubic feet of filtered water in twenty-four hours.

Filtration is sometimes effected under high pressure; and some years ago Arago gave a favorable notice of M. Henri de Fonvielle's filter, acting on this principle, which was erected at the Hôtel Dieu, at Paris. The filter had not a metre ($39\frac{371}{1000}$ English inches) in superficial extent; but under a pressure of 88 centimetres of mercury (about $1\frac{1}{6}$ atmospheres) it produced not less than 50,000 litres (about 13,210 imperial gallons) of clear water daily.

Maurras's filter consists of a water-tight iron box, about five feet six inches square, with a filtering surface within it equal to sixty superficial feet, which with $12\frac{1}{2}$ feet head of water, will filter 150,000 gallons of water in the space of twenty-four hours. The water passes through several layers or beds of loose and fine sand. The accumulated mud is from time to time got rid of by reversing the current of water, by which a violent agitation is effected, and the deposited matter is dislodged and carried away.

The expense of filtration, although considerable, is not sufficient to offer an obstacle to its general adoption, and the policy of the outlay cannot be doubted. Much credit is due to Sir William Clay for his exertions (as chairman of two of the Metropolitan Water Companies) in the introduction of improvements of this description.

ON THE PREPARATION OF SODA-WATER AND OTHER AERATED WATERS.

BY MESSRS. J. TYLOR AND SON.

Frequent application being made to us by Chemists and Druggists for instructions in the mode of preparing aërated waters, we have thought that the publication of the details of the process in the *Pharmaceutical Journal* would prove acceptable to many of its readers.

Figures 1 and 2 represent the No. 1 Soda-water Machine as fixed ready for use. This machine, which occupies a space of ten feet by four and eight feet in height, and when packed for shipping, about sixty-five cubic feet, is capable of producing 160 dozen of soda water per day.

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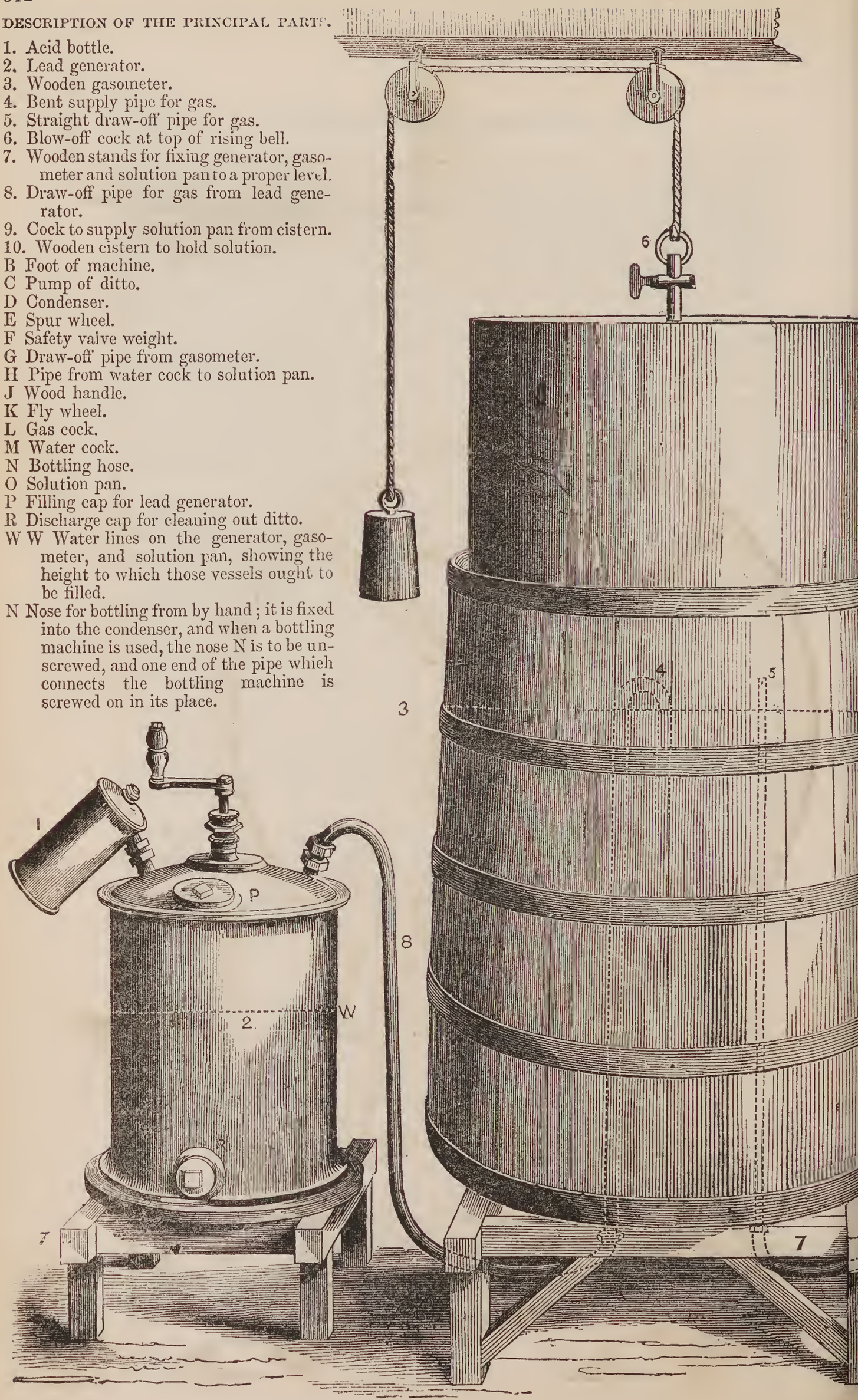
* Proceedings of the Institute of Civil Engineers, Vol ii., page 137.

Fig 1.

DESCRIPTION OF THE PRINCIPAL PARTS.

1. Acid bottle.
2. Lead generator.
3. Wooden gasometer.
4. Bent supply pipe for gas.
5. Straight draw-off pipe for gas.
6. Blow-off cock at top of rising bell.
7. Wooden stands for fixing generator, gasometer and solution pan to a proper level.
8. Draw-off pipe for gas from lead generator.
9. Cock to supply solution pan from cistern.
10. Wooden cistern to hold solution.

B Foot of machine.
C Pump of ditto.
D Condenser.
E Spur wheel.
F Safety valve weight.
G Draw-off pipe from gasometer.
H Pipe from water cock to solution pan.
J Wood handle.
K Fly wheel.
L Gas cock.
M Water cock.
N Bottling hose.
O Solution pan.
P Filling cap for lead generator.
R Discharge cap for cleaning out ditto.
W W Water lines on the generator, gasometer, and solution pan, showing the height to which those vessels ought to be filled.
N Nose for bottling from by hand; it is fixed into the condenser, and when a bottling machine is used, the nose N is to be unscrewed, and one end of the pipe which connects the bottling machine is screwed on in its place.



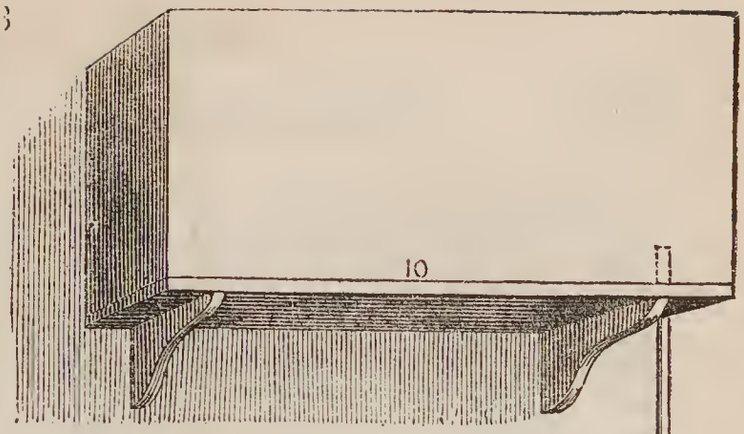
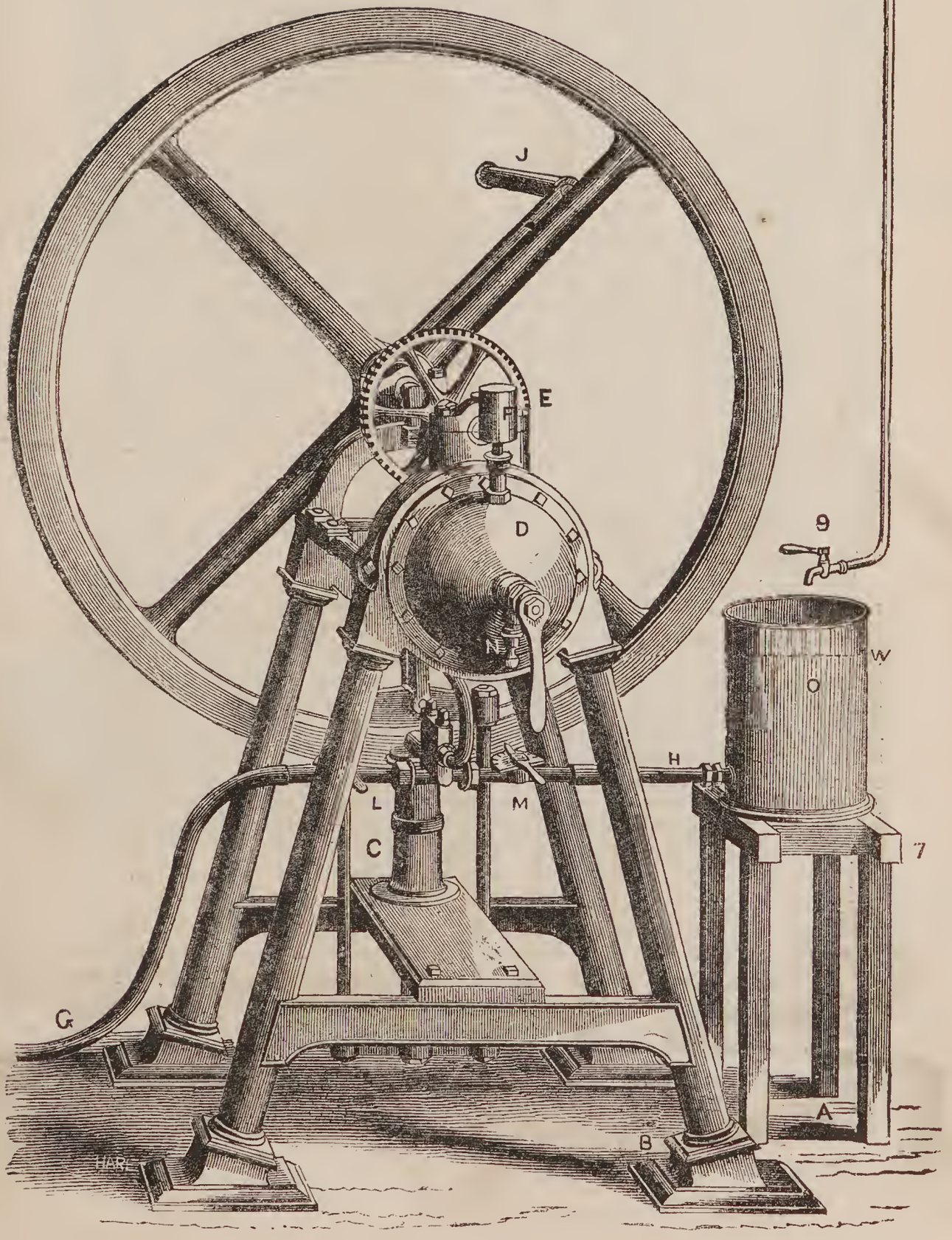


FIG. 2.



The handle I and the fly-wheel K are separated from the machine for the convenience of packing : they must be put on in the following manner : The fly-wheel has a large round hole bored through the centre, one end of which is larger than the other. Lift it on to the projecting end of the crank, with the large end on first, and turn it round until the square key-way, or groove, which is cut in the centre hole of the fly-wheel, fits exactly over the plain flat fitting, near the end of the shaft of the crank, on which you will find a square wedge tied. Then with a wood mallet, strike the centre boss of the fly-wheel (not the spokes), until it goes on to its proper place ; then strike the square wedge in with a hammer, which will hold the fly-wheel firm on the crank. There is a round steel pin or wire put through the two little holes which are bored in the iron rim of the handle. Take this pin out, but observe one of the little holes is larger than the other, and also one end of the small hole, which is bored through the end of the shaft of the crank, is also larger at one end than the other. The large centre hole of the wrought-iron part of the handle is also larger at one end than the other. Put the handle on the end of the shaft of the crank, with the large end on first, and turn it round. The dots on the handle will then correspond with those in the crank. Then strike it with a wood mallet, until the larger of the two little holes in the rim of the handle fits exactly over the larger end of the little hole which pierces through the end of the shaft of the crank ; then the taper pin may be put in to secure the handle in its place. There are four holes in the four feet of the machine marked B in the drawing, through which holes four strong bolts must be passed to screw the machine to the floor to keep it steady.

Mount the solution pan on a wooden stage about nineteen inches high, the wooden gasometer tub on a wooden stage seven inches high, and the leaden generator on a wooden stage sixteen inches high. As all the pipes or tubes are connected by union screws, the only point to look to, is to see that a leather collar is on the end of the swivel before the nut is screwed up. The position of all the pipes is shown in the drawing.

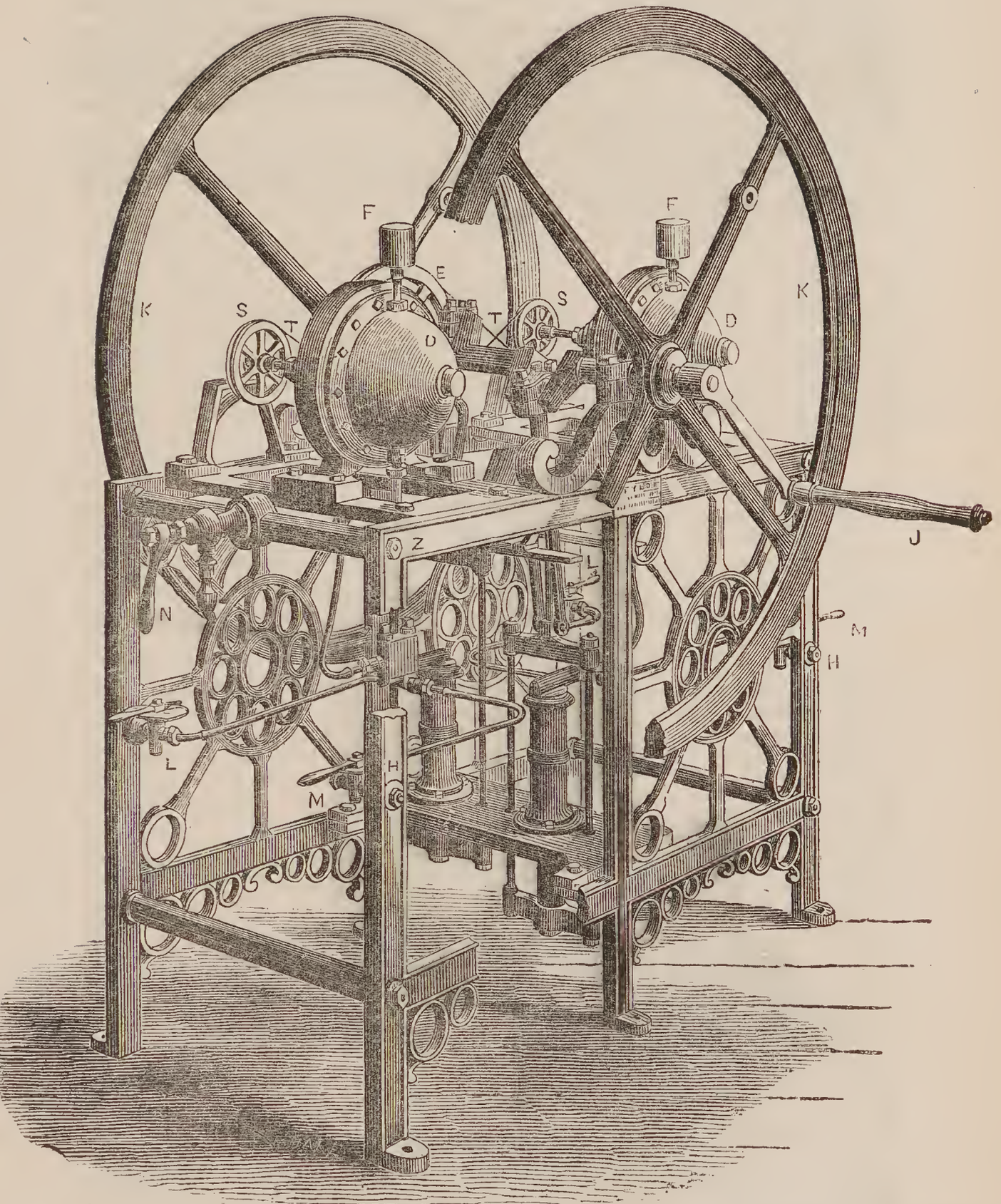
Figure 3 is the double No. 1 Soda-water Machine, which is capable of producing 300 dozen of soda-water per day. It occupies a space of twelve feet by five, and nine feet in height, and when packed for shipping takes about ninety cubic feet.

The generator and gasometer are similar to those shown at page 512, attached to the No. 1 single machine.

The machine, on being unpacked, must be put together in the same manner as the No. 1 machine, except in the following particulars:—

The bolt Z has been loosened, in order to allow the bottling cock N to turn up. Turn the bottling cock into the position represented in the drawing, and tighten the bolt Z. There are two solution pans, with pipes attached to one of them. Attach the end of the pipe to the screw in front of the cock M which is on the right of the machine, and the pipe attached to the remaining solution pan to the screw in front of the cock M, which is on the left-hand of the machine. The two solution pans must rest on two stands, about twelve inches high. A lead generator and wooden gasometer are sent of the same construction as that represented in fig. 1, attached to the single No. 1 machine, with the exception that there are two pipes, instead of the single pipe marked 5. There are also three screws at the bottom of the tub ; to one of these the lead pipe leading to the lead generator is attached ; to another, the tin pipe leading to the screw at the back of the cock I, which is at the right-hand side of the back of the machine, and the other tin pipe leads from the remaining screw on the bottom of the gasometer tub to the back screw of the cock L, which is on the left-hand side of the back of the soda-water machine. Screw these unions up tight, seeing that there are collars of leather on the unions.

FIG. 3.



Double No. 1 *Soda-Water Machine, for* 300 *dozen per diem.*

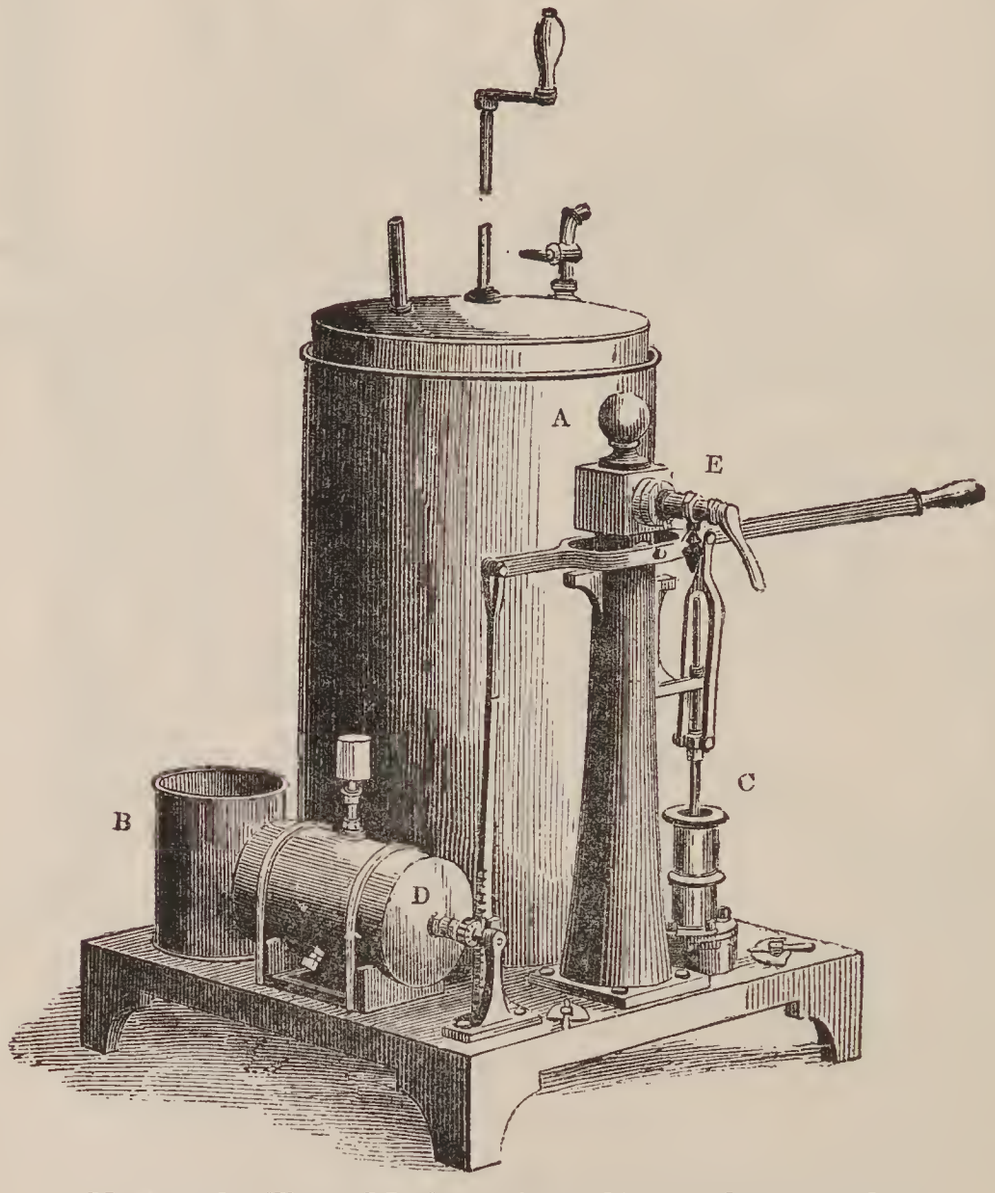
Observe that the gut bands T and T work smoothly and tightly over the large wheel or pulley E, on to the two little pulleys, S and S.

If you wish only to work the machine as a single machine, by unscrewing the two bolts which are in the coupling brass just below V, you will throw the pump out of work, and you can also unhook the gut band, which comes over the left-hand pulley S. It requires great care to disconnect these parts, or you will do an injury to the machine.

It is so arranged, that the bottlers sit on the right and left of the machine, and have the index cocks very handily at their right and left hands, and the bottling cocks in front of them. The bottling nose N unscrews, in order to receive the pipe from the bottling machine. There are four bearings in the crank which require oiling daily, or oftener, through four oil-cup holes, also the two guide rods between the two slings, and the two pins on which the slings vibrate.

Machines, similar in construction to No. 1, are made, to produce 110 dozen, or fifty dozen per day ; and still smaller quantities may be made with the apparatus represented in fig. 4.

Fig. 4.



No. 5 Soda-Water Machine, for making 24 dozen per day.

This machine consists of a copper gas generator, A ; solution pan, B ; pump, C ; condenser, D, with safety valve ; bottling cock, E ; and a separate attachment from the condenser to supply a fountain on the counter, if required. It is complete without a lead generator, but if that is preferred, it can be added with its gasometer in the place of the copper gas generator. One man working at this apparatus can, without assistance, manufacture and bottle twenty-four dozen of soda-water or lemonade in the day.

The whole machine (gas work included) is compressed into a square of two feet six inches, and every thing is fixed firmly upon the iron frame which forms the foundation.

DIRECTIONS FOR MAKING SODA-WATER, &c. WITH A NO. 1 MACHINE.

A wooden tub or box, lined with lead or earthenware, must be provided to hold the solution of soda and water, which is in the proportion of one ounce of bicarbonate or sesquicarbonate of soda, to four gallons of water. Should the water become milky when the soda is put in, it must remain until it becomes clear. A draw-off pipe must be inserted on the bottom of the tub or cistern, raised three or four inches above the bottom, and at the end of this draw-off pipe, a cock to keep the solution pan always nearly full, which is important. Next fill the wooden gasometer with water, as high as the water line marked in the drawing. This is also important, as the level of the water must always remain an inch or so below the top of the pipe 5, and of course the mouth of the bent pipe 4 will be several inches below the level of the water. The water in the gasometer will want filling up occasionally, to keep it to this level; but the water need not be changed oftener than from every two to six months. Put the copper rising bell into the wooden gasometer tub, and attach it to a piece of cord which goes through the pulley on the ceiling, and supports a balance-weight. By opening the cock 6, the bell will descend as far as it will go; but it is better not to let it at any time descend to its lowest point, as it is more trouble to raise it again.

Take a pail, and mix 14lbs. of pounded whiting or chalk, with enough water to fill the lead generator two-thirds full. When mixed, this should be of the consistency of cream. If chalk or whiting cannot be obtained, pounded oyster shells may be used, or pounded limestone; but not burnt lime or burnt limestone. Take off the cup P, and put in the mixed whiting and water, and screw the cup P on again, with one of the wrenches sent.

Unscrew the cap on the top of the acid bottle I, and pour in a quart of diluted sulphuric, muriatic, or nitric acid. About half acid and half water should be mixed in an open leaded or earthenware pan. If the pan is not an open one, there may be danger of its breaking, through the heat generated in mixing acid and water together. Some makers do not dilute the acid at all.

The gas made from either of the three acids mentioned will be equally good. Generally, sulphuric acid is the cheapest, and therefore the best. Screw the cap on to the top of the acid bottle again, and swing the acid bottle a little round, invariably at the same time turning the wood handle round, which is at the top of the lead generator. This will cause a little acid to flow out of the bottle, and fall into the lead generator, and at the same time the whiting and water will be well mixed with the acid, which is effected by turning the wood handle round for two or three minutes. As soon as the acid is mixed with the whiting and water, gas is generated; this gas rises to the top of the generator, and passes out through the pipe 8, and comes in at the bottom of the wood gasometer tub; it rises through the pipe 4, dotted in the engraving. It will be seen that the top of the pipe 4 is bent down again a few inches into the water. The reason of this is, that the gas may pass out of the mouth of the pipe into water, and be thus cleansed and purified by contact with the water. After it comes out of the pipe, it collects on the top of the copper bell, and lifts it up.

The first time the machine is used, open the cock 6 as soon as the bell has risen up to its full height; this will allow the air which was in the bell to escape. Then swing the acid bottle round a little, and turn the agitator so as to make some more gas, which will cause the bell to ascend again; then, if when the cock 6 is opened the smell of the gas is pungent, it will be fit for use. It is always desirable to make gas slowly; and it is necessary to swing the acid bottle several times separately, and to sway it a little further each time, in order to make the copper bell rise to the top. It would be very improper to swing the acid bottle, so as to send its con-

tents at once into the generator, as the gas would be evolved so quickly, as either to burst the generator, or to throw up the whiting and water into the pipe 8. As soon as you observe that the acid produces no gas, although well stirred with the agitator, you must conclude that the whiting is exhausted, or that your acid bottle requires refilling. The whiting is easily removed once or twice a day by unscrewing the cup 8, and then putting a fresh charge of whiting and water, mixed as before described. As the level of the water in the wooden gasometer tub must always stand one or two inches below the top of the pipe 5, it is obvious that as soon as the machine is set to work, the gas will be drawn from out of the copper bell down the pipe 5 into the pipe G, and thence into the pump of the machine.

You will open the gas cock L until the index point points to open, and also the water cock M, until the index point points half-way between shut and open. These proportions are nearly right; but you will adjust exactly to your own taste, but you must never have the water cock open alone. One man at the handle J will turn it round easily at the rate of 45 revolutions or more per minute, and an experienced bottler, at the condenser D, will draw off the soda-water at the rate of twelve dozen per hour, or more.

As soon as the pressure is up, the weight F, which is on the safety valve, will rise up, and then bottling may be commenced. Care should be taken that the working parts should be oiled every day, or oftener, if required—viz., the bearing just behind the safety valve; a small hole for the oil will be seen on the top of the iron coupling; the bearing on the top of the connecting coupling, which is in the throw of the crank; the other bearing just this side of the fly-wheel; the iron rod which works up and down through a guide-hole also requires oiling; and the bolt, or pin, on which the bottom of the sling vibrates also requires oiling, and a little hole at the bottom of the rod which is within the sling, leads to this pin. No other part need be touched with oil, the teeth of the spur-wheel with a little tallow. When the machine has been at work a few minutes, the leathers will become wet, and then the nuts may be screwed up tight by means of the wrenches sent, the large wrench is alone for the large nut beneath the pump, great care must be taken not to bruise the piston in screwing up the nut, as the smallest bruise will be continually cutting the cup leather, and render the pump leaky. Should this by any accident occur, the bruise must be immediately removed by a smooth file.

WITH NO. 5 MACHINE.

Lift off the copper rising bell, and put in 14lbs. of powdered chalk or whiting, mixed with as much water as will fill the inner case of the copper gas-generator two-thirds full. Fill up the outer case with water till within six inches of the top. Replace the copper bell and agitator, opening the cock in the top, by which means it will fall into the position represented in the engraving. Shut the cock, and insert a lead funnel into the adjoining copper pipe, and pour down cold diluted sulphuric acid, invariably at the same time turning the winch handle to stir up the whiting and water, which must be removed when exhausted at the end of the day, or other period, by means of the cup and screw provided near the bottom. The copper bell will be elevated by the gas generated within it, but as that gas will be mixed with the common air formerly in the bell, it must be tested by opening the gas-cock, and letting it escape, until the pungent smell indicates its purity.

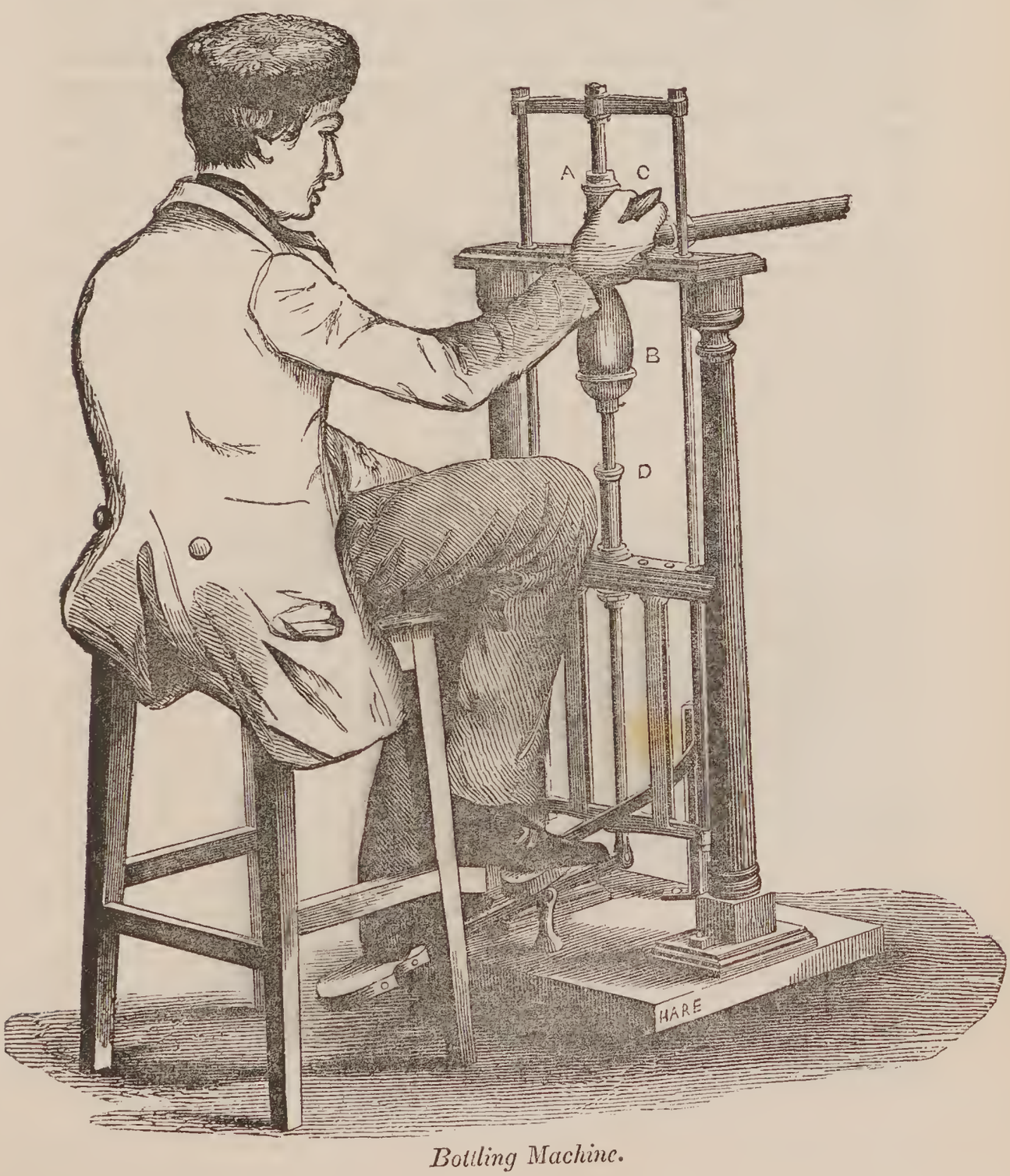
The solution-pan B contains a charge of water corresponding with one charge of gas in the generator. The cylinder D holds two dozen bottles, but not more than from six to twelve bottles should be drawn without working the long lever. From one to two ounces of carbonate of soda are

sufficient for four gallons of water, and this should be ready mixed to fill up the solution-pan when empty. Work the long lever for fifteen minutes, letting it *strike home both up and down particularly*. Take care that the right-hand or gas-cock is full open, and the left-hand or water-cock only partly open, and regulated so that the solution-pan may be emptied in proportion to the gas generator. Draw off, say six bottles, either from the bottling-nose E, or from the fountain. Add sulphuric acid ; stir as before, to elevate the copper bell again ; fill up the solution-pan, and pump for five minutes, when another six bottles may be drawn. A little practice may teach the regulations of the water-cock, and the taste will determine if the proportions of gas and water are correct.

Lemonades and gingerades may be made by putting the respective syrups into the glass or bottle, and then adding soda-water to them.

As considerable experience is necessary to enable a man to bottle off soda-water directly from the machine with rapidity, the *bottling machine*, fig. 5, is frequently used, as an inexperienced operator may bottle as rapidly with this as an experienced man could without it.

Fig. 5.

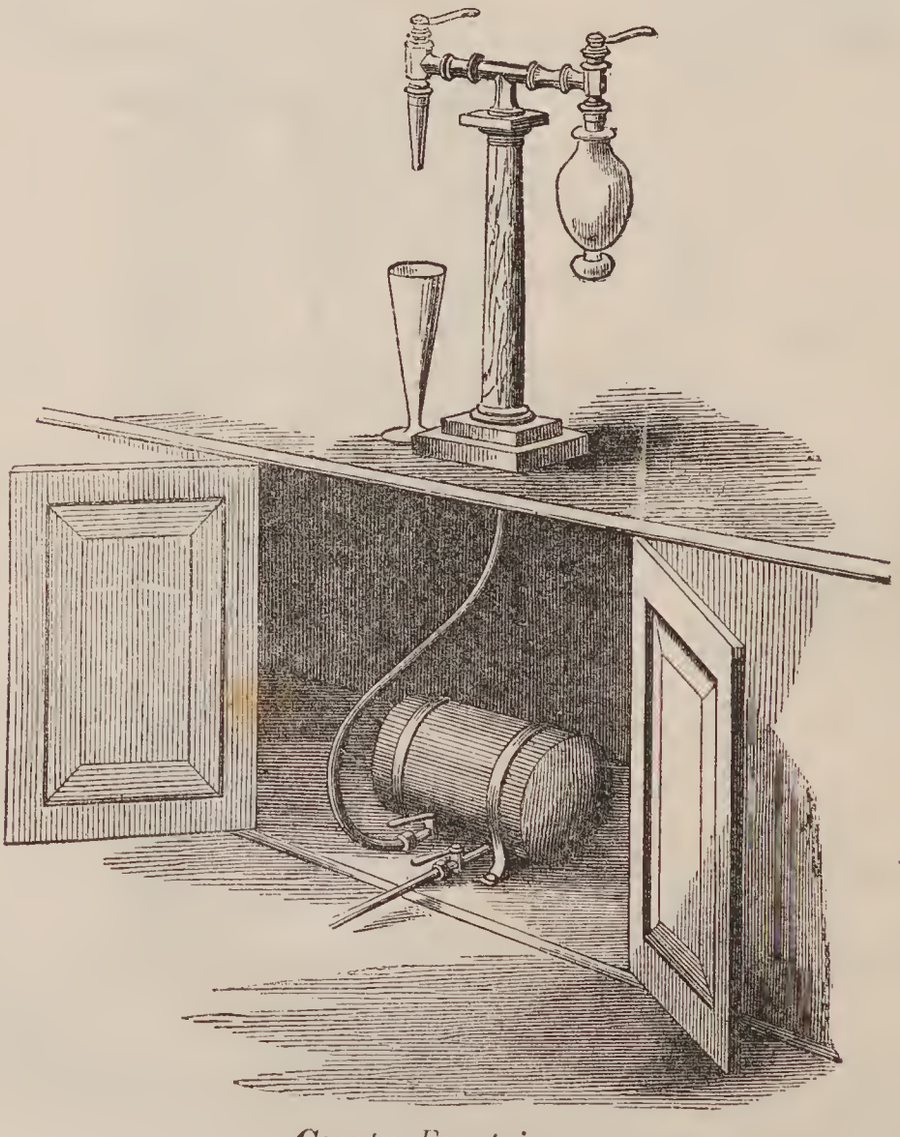


Bottling Machine.

DIRECTIONS FOR BOTTLING WITH THE MACHINE.

Choose good corks, and put them to soak in water, and then with a cork-squeezer fit them into the bottles. Put a piece of wire or string round the necks of the bottles. A number of bottles being prepared in this manner, the bottler takes one up, and extracts the cork, which he puts up the interior of the cylindrical fitting A; there it will stick, being held up by the three spikes which are at the top. He then places the bottle in the cup B, and his foot on the left treadle, thus holding the bottle firmly in its place. The lever-handle C is then turned to admit a supply of soda-water into the bottle. The left foot must be eased a little, in order to let some of the gas in the bottle escape, and instantly pressed down again, when the lever C may be again turned, which will cause the bottle to fill. The lever C being then shut, with the right-hand the bottler takes hold of the long projecting lever, and presses it down until he sees the cork is sufficiently in the bottle; then with the assistance of the right-foot on the right treadle, he lowers the bottle B as far as D, at the same time easing his left foot. This gives him an opportunity of passing the wire, or string, through the notch in the brass plunge, which presses upon the top of the cork, and fastens it. The cross-tie can be put on afterwards by a lad. Lemonade is bottled in the same manner, syrup being measured into the bottle first. An active person will learn to bottle the best quality soda-water in a few hours. About ten dozen per hour is a fair rate, although we have seen twice that quantity done in an hour.

FIG. 6.



Counter Fountain.

In the retail sale of soda-water, it is found advantageous to use the counter-fountain, fig. 6, as there are no drawbacks such as occur in the bottled soda-water trade, from breakage of bottles and cost of bottling.

The copper cylinder represented in the engraving is filled daily, or as often as required, by a soda-water machine. Where a large business can be done, it is found convenient to employ the No. 5 Machine to make the soda-water in. The Counter-Fountain is then attached direct to the machine, and no copper cylinder underneath the counter will be required. As the No. 5 Machine only occupies a space of two feet six inches square, it can be put in a cupboard or cellar, and by working it one or two hours a day, the fountain can be supplied with the freshest and best soda-water, and other effervescent beverages, of a strength greater than it would be safe to put into glass bottles, and at a cost of 6*d.* or 1*s.* per diem.

Warwick Lane, Newgate Street, London.

ON THE ADJUSTMENT OF THE RELATIONS BETWEEN THE ANIMAL AND VEGETABLE KINGDOMS,

By which the Vital Functions of both are permanently maintained.

BY ROBERT WARINGTON, F.C.S.

This communication will consist of a detail of an experimental investigation, which has been carried on for nearly the last twelve months, and which appears to illustrate in a marked degree, that beautiful and wonderful provision which we see everywhere displayed throughout the animal and vegetable kingdoms, whereby their continued existence and stability are so admirably sustained, and by which they are made mutually to subserve, each for the other's nutriment, and even for its indispensable wants and vital existence. The experiment has reference to the healthy life of fish preserved in a limited and confined portion of water. It was commenced in May, 1849, and the subjects chosen were two small gold-fish. These were placed in a large glass receiver of about twelve gallons capacity, having a cover of thin muslin stretched over a stout copper wire, bent into a circle, placed over its mouth, so as to exclude, as much as possible, the sooty dust of the London atmosphere, without, at the same time, impeding the free passage of the atmospheric air. This receiver was about half filled with ordinary spring water, and supplied at the bottom with sand and mud, together with loose stones of larger size of limestone tufa, from the neighbourhood of Matlock, and sandstone; these were arranged so that the fish could get below them, if they wished so to do. At the same time that the fish were placed in this miniature pond, if I may so term it, a small plant of the *Vallisneria spiralis* was introduced, its roots being inserted in the mud and sand, and covered by one of the loose stones, so as to retain the plant in its position. The *Vallisneria spiralis* is one of those delicate aquatic plants generally selected by the microscopist for the exhibition of the circulation of the sap in plants. It throws out an abundance of long, wiry, strap-like leaves, of about $\frac{1}{4}$ inch in breadth, and from 1 to 3 feet in length; these leaves, when the sun shines on them, evolve a continued stream of oxygen gas, which rises in a current of minute bubbles, particularly from any part of the leaf which may have received an injury.

The materials being thus arranged, all appeared to go on well for a short time, until circumstances occurred which indicated that another and very material agent was required to perfect the adjustment, and which, from my not having thought of at the time of commencing the experiment, had not been provided against. The circumstances I allude to arose from the internal decay of the leaves of the *Vallisneria*, which became yellow from having lost their vitality, and began to decompose; this, by accumulation,

rendered the water turbid, and caused a growth of mucus, or green slimy matter on the surface of the water, and on the sides of the receiver. If this had been allowed to increase, I conceive that the healthy life of the fish must have suffered, and probably their vital functions have been destroyed. The removal of these decaying leaves from the water, therefore, became a point of permanent importance to the success of the experiment. To effect this, I had recourse to a very useful little scavenger, whose beneficial functions have been too much overlooked in the economy of animal life—I mean the water-snail, whose natural food is the very green, slimy growth, or mucus and decaying vegetable matter, which threatened to destroy the object which was wished to be obtained. Five or six of these creatures—the *Himnæa stagnalis*—were consequently introduced, and, by their continued and rapid locomotion and extraordinary voracity, soon removed the cause of interference, and restored the whole to a healthy state, thus perfecting the balance between the animal and vegetable inhabitants, and enabling both to perform their vital functions with health and energy.

So luxuriant was the growth of the *Vallisneria* under these circumstances, that, by the autumn, the one solitary plant that had been originally introduced, had thrown out myriads of off-shoots and suckers, thus multiplying to the extent of upwards of thirty fine, strong plants ; and these threw up their long, spiral, flowering stems in all directions, so that, at one time, more than forty blossoms were counted lying on the surface of the water.

The fish have been lively, bright in colour, and appear very healthy, and the snails also—judging from the enormous quantity of gelatinous masses of eggs which they have deposited on all parts of the receiver, as well as on the fragments of stone—appear to thrive wonderfully, and, besides their functions in sustaining the perfect adjustment of the series, afford a large quantity of food to the fish in the form of the young snails, which are devoured as soon as they exhibit signs of vitality and locomotion, and before their shell has become hardened.

Thus we have that admirable balance sustained between the animal and vegetable kingdoms, and that in a liquid element. The fish, in its respiration, consumes the oxygen held in solution by the water as atmospheric air ; furnishes carbonic acid ; feeds on the insects and young snails ; and excretes material well adapted as a rich food to the plant, and well fitted for its luxuriant growth.

The plant, by its respiration, consumes the carbonic acid produced by the fish, appropriating the carbon to the construction of its tissues and fibre, and liberates the oxygen in its gaseous state to sustain the healthy functions of the animal life, at the same time that it feeds on the rejected matter, which has fulfilled its purposes in the nourishment of the fish and snail, and preserves the water constantly in a clear and healthy condition,—while the slimy snail, finding its proper nutriment in the decomposing vegetable matter and minute confervoid growth, prevents their accumulation by removing them from the field, and by its vital powers, converts what would otherwise act as poison, into a rich and fruitful nutriment, again to constitute a pabulum for the vegetable growth, while it also acts the important part of a purveyor to its finny neighbours.—*Quarterly Journal of the Chemical Society.*

ON THE PRESENCE OF LEAD, COPPER, AND SILVER IN SEA-WATER, AND OF THE LAST METAL IN ORGANIZED BEINGS.

BY MM. MALAGUTI, DUROCHER, AND SARSEAU.

The authors decided on making researches on the above subject by the fact, to which two of them had already drawn the attention of the Academy, that silver is widely diffused in metallic minerals. For example, in blendes

and pyrites its presence is very common ; its absence from galenas is an exception. But as salt-water, by long action, is capable of converting these substances into chlorides, which it dissolves, the author inquired whether sea-water might not contain these metals, which, in the form of sulphurets, it either washes or covers in the earth. Such were the motives for research. They were not, however, undertaken till after having dispelled every kind of fallacy, by a minute examination of the reagents and recipients to be employed.

The authors proved the presence of silver in the water of the ocean by two different methods; it was taken at a distance of some leagues from the coast of St. Malo, and the results were compared by researches as to this metal in the fucus of the same latitude. Of all those which the authors examined, the *F. serratus* and *ceramoides* were the richest ; their ash contained at least $\frac{1}{100000}$, whilst the sea-water contained but a little more than $\frac{1}{100000000}$.

If the water of the sea is argentiferous, the common salt and artificial products derived from it ought also to be so; and, in fact, experiment proved this to be the case. Common salt, common muriatic acid, and artificial soda contain minute quantities of silver. Does, however, the generality of the fact depend upon a constant law, or on a collection of variable causes ?

The authors sought to solve this question by examining the sal gem of Lorraine, which very probably represents the ancient seas. It was fortunately found to contain silver—and hence the authors conclude that the presence of this metal in the waters of the ocean depends upon a constant law.

Never losing sight of the point from which they set out, the authors inquired whether terrestrial plants might not assimilate, by means of their roots, the silver which in the state of solution might be presented to them by subterranean waters. This water, mineralized by many salts, and among others, by chlorides, would be enriched with silver by its action on the metallic sulphurets with which it would meet in its course. The examination of ashes derived from a mixed heap of different kinds left no doubt of the presence of silver in different vegetable tissues ; this fact indicated another, that of the presence of this same metal in the animal economy. This the authors conceive themselves able to state, from experimenting on considerable quantities of ox blood.

Lastly, it remained to be determined whether additional evidence of the extreme diffusion of silver, and its independence of every accidental or inherent cause in the modern world, could not be obtained by researches on ancient vegetables. The ashes of coal were examined, and the authors state, that the presence of silver in them was not so satisfactorily demonstrated as in the ashes of modern vegetables.

After many useless attempts, the authors gave up the direct search for lead and copper in sea-water; but they feel convinced that it is to be found. By examining several species of fucus, they found in their ashes $\frac{18}{1000000}$ of lead, and a little copper : this proves that, if the quantity of these two metals in sea-water is so minute as to escape detection by reagents, it is not sufficiently so to escape the assimilating power of plants.

To recapitulate the principal facts to which the authors call the attention of the Academy ; they are the presence of silver in sea-water, in sal-gem, and in organized beings ; the presence of lead and copper in certain species of fucus, and consequently in the medium in which these plants live.—*Comptes Rendus*, Decembre 26, 1849, and *Phil. Mag.*

LIQUOR SENNÆ AROMATICUS.

This preparation resembles the fluid extract of senna of Mr. Duncan (Edinburgh), the formula for which is published, vol. iii., page 115. Dr. Tweedie has substituted tincture of ginger for rectified spirit, and has found the preparation efficacious, and free from any objectionable taste; we therefore publish the formula on his authority:—

Tinnevelly Senna	15lbs. (av.)
Treacle	6lbs. (av.)
Tincture of Ginger	f ℥30
Water q. s.	

Exhaust the senna by displacement, or by infusion and expression. Three or four times its weight of water is sufficient. Evaporate the strained liquor to ten pounds, in which dissolve the treacle previously concentrated over the vapour bath, until a little of it becomes nearly dry on cooling. When cold, add the tincture, and, if necessary, add water, to make the product measure fifteen (16oz.) pints when finished.

ON THE ACTION OF ARSENIOUS ACID UPON ALBUMEN.

BY MR. JOHN B. EDWARDS, F.C.S.

The attention of the Liverpool Chemists' Association has been recently directed to the above subject by Dr. Brett, in two Lectures upon Arsenic; and feeling interested in it, I have since made several experiments with a view of determining whether arsenious acid combines with albumen in atomic proportion, as believed by Professor Liebig*, or whether such a compound is not a mere mechanical mixture of the two substances.

Liebig states, that 100 grs. of albumen combines with 1¼ grs. of arsenious acid, and that it is in virtue of the powerful affinity existing between these bodies, that life is destroyed when they are brought together in the living organism.

I shall not notice, on this occasion, the physiological and pathological objections to this view, which were ably urged by Dr. Brett on the occasions referred to, but proceed to detail my experiments, and notice the objections arising therefrom to the "Chemical Theory."

I took one grain of opaque arsenious acid, in perfect solution in water, and 100 grs. of the glairy albumen of eggs, thoroughly mixed them by trituration, and coagulated by heat; the filtrate contained a considerable quantity of arsenious acid. The coagulate was well washed with distilled water, and the washing gave a deposit of arsenic on copper, by Reinsch's test; ½ oz. of the same gave, by Marsh's apparatus, a number of large stains on porcelain, which gave evidence of being arsenic, by the silver, copper, and sulphide of hydrogen tests. The coagulate was well washed, and *bruised in a mortar*, till the filtered liquid gave no indications of arsenic by Reinsch's test; the coagulate was then destroyed by sulphuric acid, neutralized, and tested by the same method; not the slightest deposit could be obtained, though boiled for half an hour, but on the addition of a solution containing $\frac{1}{1000}$th part of a grain of arsenious acid, the copper was immediately stained.

No combination, therefore, could have taken place, for the whole of the acid was removed by patient trituration with hot water. This leads me to think that other experimenters, who have not detected arsenic in their

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* *Animal Chemistry*, p. 361.

washings, have neglected *thoroughly to break up the mechanical net-work of the coagulate.* I repeated this experiment six times, varying the proportions and the circumstances ; but in each case my result was the same.

In one experiment, in which I used 100 grs. of albumen, and ¼ gr. only of arsenious acid, I detected arsenic in five or six washings, and afterwards failed to detect it in the coagulate when decomposed. In another case, I whisked the albumen with water for some minutes, in order to destroy the organic structure, and then digested for two hours at 98° Fahr., before coagulating ; boiling water soon dissolved the whole of the arsenious acid, and none could be detected in the washed coagulate.

I then took warm sheep's blood, before congelation, 960 grs.; arsenious acid, in solution, 2 grs.; digested at 98° for three hours, and then coagulated. In this case, also, the whole of the acid was removed by boiling water. I next took 1000 grs. blood and 5 grs. arsenious acid ; digested at 98°, as before, for two hours, then coagulated ; by repeated boiling, I extracted the whole of the acid, the residue giving no trace by Reinsch's test ; I then evaporated the washings to dryness at a low temperature, redissolved in hot water, and through the filtered solution passed a current of hydrosulphuric acid gas. I collected the tersulphide of arsenic thus formed, washed, and dried by a water-bath ; the precipitate weighed 5.8 grs. According to theory, 5 grs. of arsenious acid would be equivalent to 6.22 of the tersulphide. The correspondence of the above result proves that the whole of the acid was removed by boiling water.

I took the coagulate obtained from 2 grs. acid, and 200 grs. albumen, washed it with cold water, and gave it to a healthy young rabbit ; it was violently purged, and died in about ten hours. Upon examination the stomach was found inflamed, with extravasation of blood in patches, amounting in one or two spots to positive ulceration,—also considerable vascularity of the trachea, bronchial tubes, and intestines. The coagulate was found in the stomach *undigested,* the rabbit being a herbivorous animal ; the acid had been simply dissolved by the juices of the stomach, without decomposition of the albumen.

I then offered the same quantity to a remarkably fine healthy guinea-pig ; it refused to take the whole, and I suppose about 1¾ grs. of arsenious acid was actually taken, it was purged, frothed at the mouth, and died in about sixteen hours. The stomach and other organs were found much more violently inflamed than those of the rabbit, probably on account of its living longer. *No coagulate was found in the stomach ;* it was therefore digested, this being an *omnivorous* animal.

The soft organs of the rabbit were examined by Dr. Brett. He found arsenic in each. After finding a large quantity in the mucous coat of the stomach, he submitted that organ to a continuous stream of water for some time ; when he could no longer detect arsenic in the washings, he decomposed the tissue with nitric acid, neutralized, and boiled for a considerable time with Reinsch's test, but was unable to detect arsenic.

I examined several organs and muscles of the guinea-pig, and found arsenic in each. I also treated the stomach of this animal in the same manner, and removed the whole of the arsenic by hot water.

Whatever objections may be raised to the first experiments with albumen, I think the facts proved by the latter are weighty arguments against Liebig's views. If water so readily extracts arsenious acid, both from the compounds formed in the laboratory, and from those which nature has prepared, surely we may conclude that its retention is simply mechanical, and affords no ground for the theory which that eminent chemist has raised upon it.—*Quarterly Journal of the Chemical Society.*

ON THE COMBINATION OF ARSENIOUS ACID WITH ALBUMEN.

BY MR. KENDALL.

A short time since, I received from a former pupil of mine, Mr. Edwards, of Liverpool, a communication, in reference to a controversy which had sprung up in Liverpool respecting the action of albumen upon arsenic. He at the same time enclosed a paper which he had read before the Chemical Society of London, the object of which was to show that arsenic and albumen do not form a permanent chemical compound, and requested me, if I felt any interest in the matter, to investigate it, and either to confirm or refute his views. I have not been able to go much into the subject; but I have been enabled to convince myself of the baseless nature of the view which regards arsenic as possessing energetic affinity for the albuminous substances, and the resulting compound as having great power of resisting decomposing influences.

The question seems to be :—Does arsenious acid form, with albumen, fibrin, &c., a definite and permanent compound—insoluble in water—and not capable of decomposition without destroying the organic structure with which it is associated? Liebig and others affirm that it does; but against this dictum of the great master of physiological chemistry, murmurs of dissent seem to have been arising continually from various quarters, until at last they have broken out in absolute denial.

The solution of the question is interesting, not only to the Chemist and toxicologist, but it has important bearings, physiological and pathological, which render it desirable that it should receive a searching investigation. It decides the point whether arsenic is or is not a corrosive poison—whether it is necessary for poisons to produce their fatal effects that they should enter the circulation. It would settle the much-vexed question as to the mode by which inorganic poisons destroy life.

The chemical theory of Liebig offers such a simple and beautiful explanation of the subject, that it is difficult to withhold confidence from it. That theory is, that inorganic poisons form a permanent chemical compound, by uniting with the constituents of the organ with which they come in contact, breaking up its organic structure, and so destroying its vital functions. This doctrine Liebig applies to the greater number of metallic poisons, including arsenic. There seems reason to believe that, as regards corrosive sublimate, nitrate of silver, &c., this explanation is correct; and it is possible that the assertion, with regard to arsenic, may have arisen from hasty generalization from facts observed with regard to these more chemically-active substances. At all events, this theory must ultimately stand or fall, as it may be consistent with truth or not.

I will now detail the experiments which have led me to doubt the correctness of this theory, until I see more satisfactory reasons than I have yet done in support of it.

I considered that, if arsenic forms a definite and permanent compound with albumen, insoluble in water, each should be capable, when added in excess to the other, of withdrawing it from its solution in water; and also, that when the combination is once effected, water

should be unable to withdraw either from the other. The experiments made by Mr. Edwards seem to settle the latter point, and I will now endeavour to illustrate the former.

In calculating the equivalent quantities of each substance required to form the insoluble compound, I assumed the albumen of eggs to consist of about one part anhydrous albumen and five parts water, and, taking the equivalent of albumen after Liebig to answer to the number 7447, then 100 grains of albumen of eggs would be equivalent to about a quarter of a grain of arsenic.

I took a quarter of a grain of opaque arsenious acid in solution, and 200 grains (double the equivalent) of albumen of eggs, triturated them together, and digested at a gentle heat for some hours—*taking care not to coagulate the albumen;* diluted and filtered; the filtrate was found to contain arsenic in abundance. The same quantity of albumen was then added to the filtrate, digested, filtered, and tested; the indications of arsenic did not appear diminished. More albumen was then added to the filtrate and treated as before, but with the same result. The albumen had not the power to remove the acid, and when the fluid was afterwards coagulated by heat the result was the same.

A quarter of a grain of arsenic as before, was triturated with 200 grains of albumen, digested at 98° for four hours, diluted and filtered, the coagulate well washed on the filter with lukewarm water, until when about three pints had passed through, no indications of arsenic were obtained by Reinsch's test or HS. The remainder on the filter was digested in strong hydrochloric acid. It dissolved with the characteristic colour of albumen. The acid solution was diluted and examined for arsenic as before, but no trace of it was present.

100 grains of albumen of eggs with five grains of arsenious acid in solution (arsenic in great excess) were treated as before, diluted, filtered, and examined for albumen with NO_5 and bichloride of mercury. It was found in abundance. The quantity of arsenic was first doubled, then trebled, but in neither case had it the power of removing the albumen from solution.

It would appear from the foregoing,—that when arsenious acid and albumen combine under the most favourable circumstances, the acid may be separated by mere washing with water, and that, whether the superfluous albumen has been coagulated by heat or not;—that albumen has not the power of withdrawing arsenious acid from its solution in water, and the converse that arsenious acid cannot withdraw albumen from its soluble condition. Also from Mr. Edwards's experiments, that the compound of arsenic and albumen has the same destructive power over animal life as arsenic itself.

These facts taken together seem to me sufficient to negative the idea of that intimate chemical union which the theory in question supposes. At the same time I must acknowledge that there are certain facts which give support to the idea of a chemical combination, the strongest of which is the great power of resistance to the putrefactive fermentation which organic matter acquires by contact with arsenious acid. May not the affinity between these substances be something similar to that between porous matter and organized tissues, with certain metallic oxides and salts, in which the compound formed is probably mechanical?

In examining the action of albumen upon corrosive sublimate and

nitrate of silver, which I have just done very cursorily, I find that each salt fulfils the conditions I before insisted on.

When albumen is mixed with either salt they mutually precipitate each other perfectly from their solutions, and the compound formed is not capable of separation by washing with water.

Stratford-on-Avon, March 20, 1850.

ACTION OF NITRIC ACID ON RHUBARB; AND PRODUCTION OF A NEW COLOURING MATTER, ERYTHROSIN.

BY M. GAROT.

On adding four parts of nitric acid to one part of coarsely-powdered rhubarb, in a wide-mouthed, stoppered bottle, a brisk reaction speedily takes place, accompanied by the disengagement of nitrous gas, elevation of temperature, and swelling up of the mixture. This reaction commences almost immediately with indigenous rhubarb, but less energetically with the foreign varieties. A temperature of from 60° to 70° Fah., however, is necessary to commence the action.

After leaving the ingredients in contact for two days, the foreign rhubarb acquires a pulpy consistence and orange yellow colour, the acid being almost entirely absorbed by the solid residue. The indigenous rhubarb, on the other hand, assumes the condition of a bright chrome-yellow pulp, floating on an acid liquor.

On diluting the mixtures with a large quantity of water, straining through cloth, washing, pressing, and drying the solid residues, there remains, from the indigenous rhubarb, a bright yellow, and from foreign rhubarb, an orange-coloured powder. Indigenous rhubarb yields from 8.5 to 10 per cent., and foreign rhubarb from 15 to 20 per cent. of this product.

The author proposes the name *Erythrosin* for this product, in consequence of the property it possesses of being reddened by alkalis.

Properties of Erythrosin—After being dried, erythrosin is in the form of a yellow or orange agglomerated powder, which acquires a shining appearance on being pounded in a mortar. It is perfectly tasteless; the odour slightly aromatic and nitrous, arising probably from the presence of a little nitrous acid in combination, which washing will not remove.

Action of Heat.—When exposed to the action of heat in a glass tube, abundance of yellow vapours of rhabarbaric acid are given off, which condense into a yellow crust on the sides of the tube, and leave a white residue of lime, which is more abundant in the erythrosin from foreign than from indigenous rhubarb.

Action of Water.—Cold water has but little action on erythrosin, merely acquiring a slight yellow colour; but if it be boiled, the liquid acquires a reddish amber colour, and becomes slightly acid. This acidity appears to arise from the presence of a little nitric acid, not previously removed by the washings; for it cannot be attributed to rhabarbaric acid, the quantity of which is so small, as scarcely to redden potash. When evaporated to a certain extent, the liquor deposits a gelatinous matter, having all the characters of pectin.

Action of Alcohol.—Cold alcohol has little action upon it: it acquires an amber colour, which becomes deeper on the application of heat, and finally assumes the reddish-yellow colour of Malaga wine. After treating it seven or eight successive times with boiling spirit, all soluble matter is removed, and the solutions all redden litmus paper.

On evaporating the alcoholic solution, a yellow flocculent deposit is formed, together with a crystalline pellicle over the surface; but no crystals are deposited on cooling. A dry product is obtained by evaporating

all the spirit away, and this is in the form of a granular powder of a brownish yellow colour, having some resemblance to Spanish tobacco. It has a slightly aromatic odour, and a mucilaginous and slightly acid taste, quite different from that of rhubarb.

This substance is entirely dissolved by repeatedly treating it with hot alcohol. On evaporating the solution, a granular substance of a sulphur yellow colour is obtained, the surface of which acquires an orange tint, from exposure to the air.

This substance possesses all the physical and the principal chemical characters attributed by Brandes to rhabarbaric acid, and by Geiger to rhabarbarine.

The erythrosin of indigenous and of exotic rhubarb afford products which are perfectly identical, excepting that that of indigenous rhubarb yields a larger proportion of the rhabarbaric acid.

Erythrosin of indigenous rhubarb yielded:—

Rhabarbaric acid	85.0
Insoluble matter	15.0
	100.0

Erythrosin of exotic rhubarb yielded:—

Rhabarbaric acid	60.0
Insoluble matter	40.0
	100.0

Action of Ether.—From the action of ether on the substance dissolved by alcohol, it might be inferred that it is a perfect solvent for rhabarbaric acid. It exhausts the erythrosin entirely of that principle when aided by the application of heat.

Action of Alkalis.—When erythrosin is brought into contact with the alkalis, it immediately acquires an intense purplish-red colour. It is this combination which is most deserving of attention, on account of the beauty of the colour produced, which may probably admit of application in the arts.

If one part of caustic potash be added to two parts of erythrosin, and thirty parts of water, a purplish-red solution will be obtained, which will have acquired its full intensity of colour after standing for a few days. After filtering the liquor through cotton, it may be kept for a month without alteration, and may be used as a colouring agent. In fact, one part of erythrosin will thus afford as much colour as six parts of cochineal. If a few drops of the alkaline solution be added to a piece of chalk or magnesia, it will be absorbed, and will form a rose-coloured powder, as bright as if coloured with carmine.

Erythrosate of Ammonia, after driving off the excess of ammonia, possesses the same properties as the potash salt; but its colouring power is more than four times greater. It may be advantageously used for colouring soaps, and for other similar purposes.—*Journal de Pharmacie.*

ON THE COLOURING MATTER OBTAINABLE FROM THE DEPOSIT IN TINCTURE OF RHUBARB.

BY MR. JOHN COBB.

MANY of your readers have no doubt seen in the *Journal de Pharmacie et de Chimie*, of January, the description of a peculiar colouring matter, called by Mons. Garot "Erythrose," and obtained by him by treating coarsely-powdered rhubarb by nitric acid, washing the residue, and subsequently treating it with liq. ammoniæ, or potassæ. I have undertaken

some experiments with the view of discovering some mordant, by the aid of which the "Erythrose" might be employed as a dye. In this I have been unsuccessful, but in the course of these experiments I was induced to consider whether the deposit which almost invariably takes place in tincture of rhubarb after it has been prepared a short time might not be attributable to the slow action of the oxygen of the air, and whether the result might not be the same as that produced by the more rapid oxidation of the rhubarb by nitric acid. On collecting and drying a portion of the said deposit my suppositions were fully confirmed.

Five grains of the dried deposit treated with ʒij. liq. ammon. F., gave a deep carmine solution, leaving 1.75 grains of residue insoluble in water, alcohol, or ether, and not attacked by nitric acid. I found that fifteen minims of this solution, and consequently less than half-a-grain of the solid colouring principle, sufficed to give a colour to ℥iv. of proof spirit, deeper and far more brilliant than that produced by eight grains of cochineal; fifteen minims gave to ℥i. cretæ precip. a finer colour than that produced by ten grains of cochineal, and as fine as that produced by one grain of carmine. Considering the facility with which it may be obtained, and that from the fact of its being a waste product it is expenseless, this substance appears to me worthy of attention as a substitute for cochineal and carmine for the purpose of colouring *non-acid* powders, dentifrices, tinctures, waters, &c. Acids destroy the colour, and are consequently incompatible with it.

172, *New Bond Street, April* 20, 1850.

OXIDE OF ZINC AS A PIGMENT.

BY M. CHEVALIER.

The following account of the introduction of the use of oxide of zinc for painting, is extracted from a report made to the Society for the encouragement of the Arts and Manufactures of Paris, by M. Chevalier:

The idea of employing the oxide and carbonate of zinc in painting is not new. In 1780, M. Courtois, assistant in the laboratory of the Academy of Dijon, presented, through M. Guyton-Morveau, a sample of zinc white, which was found to possess the property of unalterability by atmospheric influences. In 1783, Guyton-Morveau published in the Memoirs of the Academy of Dijon, a dissertation on the employment of zinc white in painting. In this dissertation, Guyton-Morveau, after having shown that the use of white lead ought to be abandoned, both on account of health and its proneness to change in colour, gave an account of the various experiments which he had made on different substances, with a view of obtaining a perfect white. These substances were sulphate of baryta, carbonate of baryta, borate of lime, tartrate of lime, saccharate of lime, oxalate of lime, sulphate of lead, and sulphate of bismuth; of these the tartrate of lime alone appeared to offer any advantage. He then made a variety of experiments with the oxides of tin, antimony, bismuth, manganese, and zinc; and the results led him to the conclusion, that the oxides of tin and zinc were those only which could be employed in painting. In order to obtain the last oxide (zinc), he employed—1st, the solutions of salts of zinc and caustic alkalies; 2nd, the calcination of the metal, either alone or with nitre; 3rd, the calcination of the metal in a crucible, placed horizontally in a reverberatory furnace, causing the flowers of zinc produced to pass through water, for the purpose of separating the particles of metal not oxidized; and, lastly, rubbing down the oxide with a small quantity of alumina or chalk. Subsequently, Guyton having found the calcination in a crucible to be imperfect, laborious, and even dangerous to the workmen, he proposed the employment of an apparatus constructed on entirely

new principles, and with which he obtained great success in the manufacture of the oxide.

By his experiments, made at a public sitting of the Academy, presided over by the Prince de Condé, Guyton showed that paintings executed with tartrate of lime, tin white, and zinc white, all of which had been exposed to the action of sulphuretted hydrogen, had not sensibly changed in colour. At this period, the price of zinc white was about 5s. 6d. per pound for the first quality, and about 3s. 6d. for the second quality.

As zinc white was of a less drying nature than white lead, Guyton recommended the addition of a small quantity of calcined sulphate of zinc, which at once imparted a drying quality. In 1796, Mr. Atkinson, of Harrington, near Liverpool, took out a patent for the use of zinc white, as a substitute for white lead. Guyton claimed for himself the priority of this discovery, which he proved belonged to himself, and referred to the furnace he had employed, and the various drawings on the subject which he had exhibited at Dijon; more than that, in 1781, M. Courtois had a manufactory in full operation, and warehouses open for the sale of zinc white, both at Paris and Dijon.

In 1786, a commission, composed of MM. Laporterie, Sané, Fraboulet Guignan, and Brurgères was appointed to examine and report upon the use of zinc white in painting. Their report says:—

"1. That the painting with zinc white furnishes a beautiful white colour, a little less lively than that of white lead.*

"2. That the odour of painting with zinc white was not so strong and disagreeable as that of white lead.

"3. That the zinc white took six days to dry, whilst the white lead paint dried on the fourth day.†

"4. That eight ounces of zinc white, requiring an equal weight of nut oil, covered a surface of rather more than thirty-six square feet; that eight ounces of white lead, requiring three ounces of oil, covered only fifteen square feet."

The committee made these experiments on the cabins of the Languedoc, and recommend the Minister of Marine to introduce the use of zinc white into the navy.

In a report made to the National Institute of France, in 1808, by MM. Fourcroy, Bertholet, and Vauquelin, relative to the manufactory of M. Mollerat, we find the following passage:—

"Amongst the products of M. Mollerat's establishment, the manufacture of zinc white occupies a prominent place, the employment of which cannot be too strongly recommended; its disadvantages are so trifling, when compared with the inconveniences arising from the use of white lead, that its adoption for the painting of houses cannot reasonably be rejected. In addition to salubrity, it unites the following advantages:—The tints of colour it furnishes are purer, and more clearly defined; its lustre does not tarnish; and quantity for quantity, it covers a larger superficies than white lead. It is true that it does not spread so well under the brush, but this defect is remedied by charging the brush oftener with paint, or by giving an extra coat. If people who paint their rooms were fully aware of the danger arising from the use of white lead, there can be no doubt that its employment would be much restricted; but few precautions are usually taken to avoid a danger which is not generally known, or at least is regarded as uncertain and distant. It is, however, well proved that many complaints, for which it is difficult to give any other assignable cause, are in reality occasioned by emanations from lead, which are at all times

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* The manufacture of zinc white had not then been brought to its present perfection.

† The addition of driers of suitable strength has overcome this objection.

injurious to health. Thanks are due to M. Mollerat for turning his attention to the manufacture of an article of such great utility."

In 1821, M. Duval-Lecannes executed a portrait for M. Lassaigne, in which he employed the oxide of zinc. This picture, which we have now before us, has all the freshness and clearness of its white tints preserved quite unimpaired.

In 1844, M. Matthiew addressed a communication to the Paris Academy of Sciences, on a new process for the manufacture of zinc white. M. Matthiew, however, did not make this process known, though he strongly dwelt on the advantage of the substitution of zinc white for white lead, in painting. Notwithstanding, however, all that had been done by Courtois, Guyton-Morveau, Atkinson, Mollerat, Duval-Lecannes, Matthiew, and Conté, the zinc white does not appear to have been used to any extent, and it is from the exertions of M. Leclaire, on this subject, that public attention has been thoroughly aroused to the appreciation of the merits of zinc white.—*Patent Journal.*

IMPORTATION OF OXIDE OF ZINC DUTY FREE.

A COMMUNICATION has been made to the Customs' authorities by the Secretary to the Lords Commissioners of Her Majesty's Treasury, stating that he had received the commands of their Lordships to transmit to them for their information a communication from the Board of Trade on a memorial, praying that a material denominated grey oxide of zinc may be henceforth imported into the United Kingdom without payment of duty; and that he was directed to state that their Lordships of the Treasury at present concur with the Lords of the Committee of Privy Council for Trade in considering that the article in question should be admitted free of duty. It was, however, the wish of their Lordships that it should be understood by the Commissioners that if it should appear to them that there is any substantial difference or distinction between white oxide of zinc (which is already by Treasury order admissible free of duty) and grey oxide of zinc, their Lordships would be prepared, upon being furnished with adequate information from scientific persons upon the subject, to reconsider their decision. It appears from competent authority that the material is an impure oxide of zinc, produced during the process employed for extracting metallic zinc from the ore, and that the grey colour which it bears results from its admixture with portions of coke placed with the ore in the retorts used for the smelting process, and that the only preparation to which the substance thus obtained is then subjected to consists in crushing and sifting it, and on consideration of the matter by the Commissioners of Customs, it has been directed that in future grey oxide, equally with white oxide, of zinc is to be admissible duty free.

ON PASSIVE AND ACTIVE OXYGEN; ON SUPEROXIDE, OZONE, CHLORINE-WATER, AND CHLORIDE OF LIME.

BY DR. A. BUCHNER.

IT is one of the most remarkable properties of oxygen that it preserves, in a gaseous state and at a low temperature, a certain inactivity from which it can only be roused by the influence of water, electricity, increased heat, phosphorus, and other agents. Many very combustible substances, such as hydrogen, sulphur, selenium, charcoal, iron, zinc, &c. are not oxidized by dry oxygen at the common temperature; but as soon as water, electricity, or a higher temperature (which reagents are of themselves not able to change these bodies) co-operate, the oxygen begins to act, and oxidation soon takes place.

Professor Schönbein has made the interesting discovery that phosphorus moistened with water possesses, from its tendency to become oxidised even at common temperature, the power of rousing the oxygen of the atmosphere to activity, the same as electricity or an increased temperature, so that the combining tendency imparted to it by the phosphorus is propagated even to those particles of oxygen which cannot combine with phosphorus. Schönbein calls the thus produced state of the oxygen, *ozone;* considering that it is yet mixed with the nitrogen of the atmosphere, the ozone might be called *superoxide of nitrogen*, just as Thénard denominates the analogous state of oxygen united with water, *superoxide of hydrogen.* Berzelius calls the altered state in general *Allotropy*, if the substance cannot be decomposed; and *Isomerism* when it can be decomposed. These words certainly give us *names*, but no explanation of the cause of the altered tendency and condition. If oxygen be excited by chlorine and water to increased and altered activity, we call the agent *chlorine water, chloride of lime, &c.* If the oxygen be furnished by the oxide of a metal in a condensed state, fit for activity, we call the compound a *superoxide* or *hyperoxide.*

Professor Schönbein, of Basle, has recently made and published (*Poggendorff's Ann. d. Phys. und Chemie*, lxxviii, 162) some nice experiments on the effects of superoxide of lead on oxidisable substances, which prove that the superoxides of lead as well as other hyperoxides, *e. g.*, peroxide of manganese, chromic acid, &c. have the same effect as ozone.

Iodide of potassium is decomposed by the oxidation of its potassium, so that the liberated iodine colours starch blue ; the yellow ferrocyanide of potassium is changed into ferridcyanide of potassium ; fresh prepared tincture of guaiacum becomes blue ; hyponitric acid by oxidation becomes nitric acid ; sulphurous is converted into sulphuric acid ; indigo and other organic colouring substances become oxidized and decolorized. Also powdered charcoal is partly oxidised by superoxide of lead, by which oxide of lead is generated, which is soluble in diluted nitric acid. Common metals, such as zinc, lead, arsenic, &c. are oxidized by the reduction of the superoxide into common oxide of lead. Chloride of tin, or salts of the protoxide of tin, and salts of the protoxide of iron, are changed into stannic acid and oxide of iron. Peroxide of manganese can be oxidized and changed into red permanganic acid ; if powdered peroxide of manganese be mixed with superoxide of lead and heated to a boiling temperature with diluted nitric acid, a magnificent red liquid is obtained, which contains, besides hypermanganic acid, nitrate of lead. — *Buchner's Repertorium*, 1849, Bd. iv., p. 234.

CONSTRUCTION OF A GALVANIC CELL WITHOUT ZINC OR ANY OTHER EXCITING METAL.

BY DR. H. REINSCH.

Although it is well known that an electric current can be produced by the chemical combination of two substances, as a base with an acid, even without the co-operation of metals, this kind of excitation has but rarely been employed. I have succeeded in constructing a cell, which substantiates this phenomenon in a very simple manner, and is a step nearer to the possibility of employing the electric current, instead of steam and other powers, for working machines. A common clay cell, as described by me in the *Jahrbuch*, xvi., p. 9, is filled with coarsely-powdered coke, and a small coke cylinder for conducting the current, and moistened with nitric acid ; this filled cell is placed in a rather large beer glass, which is also filled with coarsely-powdered coke, likewise containing a small cylinder of coke for conducting away the current. The external coke powder is

moistened with a saturated solution of salt; and the conducting wires, which are fastened to iron pegs, are introduced into the bored coke cylinders. The current which is thus produced is so strong, that a small electro-magnet could draw half a pound. It consisted of iron wires of the thickness of a quill, and was five times coiled with copper-wire of a quarter millimeter thickness. A large electro-magnet, constructed of an iron bar one and a half-inch thick, and coiled with copper-wire one and a half-millimeter thick, was not at all affected by it. Weak currents act therefore only upon smaller masses of iron and spirals of thin wire. On causing the above current to act upon a small electro-magnetic machine, the effect was distinctly felt by the moistened hands ; but on connecting it with one of my large machines, it was hardly possible to bear the effect which it had on the moistened hand, and the spark was very distinct. From this it follows that the exciting metal (zinc, iron, &c. &c.), can be entirely dispensed with, and that by mere chemical combination a powerful current can be produced, which may even be increased by the common auxiliaries. If we consider that those combinations might be effected in cells, which are usually made in laboratories, it will easily be perceived how the hitherto wasted chemical power might be employed as motive force, or for decomposing water, and the thus obtained products, hydrogen and oxygen, employed for heating and illumination, and that, if this discovery be further investigated and brought to greater perfection, an entire revolution must take place in our technical and mercantile relations.—*Jahrb. f. Pract. Pharm.*, Bd. xix.

NEW GUNPOWDER.

M. Augendre, assayer at the Mint of Constantinople, has succeeded in making gunpowder, which is said to be much more powerful than common gunpowder, of a mixture of prussiate of potash and chlorate of potash with sugar. The following are the proportions which have been found to answer best :—

Crystallised prussiate of potash, dried	1 part
White sugar	1 part
Chlorate of potash	2 parts

These ingredients are separately reduced to fine powder, and then intimately mixed by the hand. In operating on any quantity, the mixture is moistened with a little water and beaten in a mortar, after which it may be granulated by passing it through a sieve, or it may be used in fine powder.

The Academy of Sciences of Paris, to whom M. Augendre addressed a communication with reference to this explosive compound, referred the subject to a commission consisting of MM. Poibert and Morin, who reported thereon to the following effect :—

The advantages of this gunpowder are :

1. That it is formed of substances having a fixed and determinate composition, which enables us to depend upon obtaining a product uniform in strength.

2. That these substances are unalterable by the action of either dry or damp air, so that they may be kept for an indefinite period, which is not the case with the charcoal employed in the manufacture of ordinary gunpowder.

3. That the manufacture requires less time, and that larger quantities of the ingredients may be stored away, and be combined as occasion may require, thus rendering large powder magazines unnecessary.

4. That the dynamic effect is much greater than that of ordinary gunpowder.

5. That the product in fine powder being equally as effective as that in the state of grain, enables us to obtain the various substances of which it is composed in the state of an impalpable powder by means of ventilation, and mixing them in the dry state in a leathern barrel, turning on its own axis.

6. That the prussiate of potash is not poisonous, but simply a saline purgative salt.

On the other hand, the disadvantages are :—

1. That the chlorate of potash contained in this powder causes the oxidation of steel fire-arms, and thus confines the employment of this powder to artillery.

2. That it is more readily inflamed than ordinary gunpowder, although much less so than all the gunpowders which have hitherto been made containing chlorate of potash.

[*The following was accidentally omitted last month.*]

THE ALLEGED EMPLOYMENT OF CHLOROFORM BY THIEVES.

BY JOHN SNOW, M.D.

In two recent cases of robbery, it has been asserted that chloroform was used to render the victims insensible ; and, although no real evidence has appeared of such having been the fact, yet the statement has gained great publicity through the newspapers, and the sentences on the prisoners have apparently been rendered more severe by the allegation.

It can readily be shown that, if thieves and prostitutes were to resort to the use of chloroform in the public streets, in the manner alleged, the attempt would only lead to their instant detection on the spot. The sensation of pungency in the nostrils and throat that is caused by this agent, when its vapour is in sufficient quantity to produce any effect on the sensorium, is so strong and peculiar, that no person can take a single inspiration without being aware that he is inhaling something very unusual. Chloroform, in fact, can never be administered without the consent of the party taking it, unless by main force, which has to be used in the case of children who are not old enough to be reasoned into taking it. If a child be asleep when the process of inhalation is commenced, it nearly always awakes before being made insensible, however gently the vapour may be insinuated. As breathing is perfectly under the control of the will, a person would, on finding such a strange attempt being made on him in the public streets, instantly hold his breath, and use all his powers of resistance to repel the assault. And supposing the handkerchief, which is the alleged weapon, were held forcibly over his mouth and nostrils, in spite of his efforts, yet he would be able to struggle as long, whilst holding his own breath, as if another person were trying to prevent his breathing by the method called Burking. When it is recollected that a race of one hundred and fifty yards can be run in one breath, these struggles, it will be perceived, would last long enough to attract a crowd.

It is not difficult to understand how the report of the above use of chloroform first gained currency. The first accounts of the use of this agent in surgery and midwifery which appeared in all the newspapers contained a description of its fruity odour and its administration on a handkerchief, but nothing was said of its pungency. Hence, many persons, as I had experience, entertained the opinion that it might be used for effecting robberies. By and by, as it was reported, a person who had fallen down in the street thought, on coming to himself, that he recollected something of a handkerchief being applied to his face, and the insensibility from which he had just recovered was attributed to chloroform. It is most

likely, if this was anything more than the ingenious invention of the reporter, that the individual in question had taken a fit. The paragraph, however, was a very suitable one for quotation; and the idea having gained general credence, it is probable that we shall often hear of it, as prosecutors who have to account for being in disreputable places and company, instead of the usual excuse of having been dining out, will try to remember something of a handkerchief.

I do not wish to apply this explanation to the case tried last week at the Old Bailey, and I cannot explain how the prosecutor got to the room of the prisoners; but I wish to state very distinctly my conviction that it was not by means of chloroform, and that, if anything was administered on a handkerchief in Whitechapel, it must have been some agent unknown to medical men, and which, if the police could discover it, would probably be of great service to humanity in the hands of legitimate practitioners. In the case tried on Saturday at the Surrey adjourned sessions, it is given in evidence that the prisoner suddenly passed a handkerchief across a man's face in the street; they afterwards went into a public-house, and were seen there by a policeman, drinking together. The man after this became insensible, and was robbed by the prisoner. The insensibility is attributed to chloroform on the handkerchief, which was suddenly passed across the man's face before he went into the public-house. This every one at all acquainted with the effects of that agent will perceive to be impossible.—*London Medical Gazette.*

Frith Street, Soho, Feb. 11*th*, 1850.

The above very clear and conclusive statement ought to be widely circulated, as a protection to the public against imposition. The belief in the efficacy of chloroform in the hands of pickpockets is still prevalent, and we have recently seen several police reports in which the alleged application of a "saturated rag or handkerchief" was apparently assumed to be an aggravation of the offence. The following case occurred during the month of March, and is, we believe, up to the present time under litigation.

Mr. Amiss Tailor, 65, Conduit Street, was charged before Mr. Hardwick for an assault on Mr. J. Cunnington, of 10, Gloster Place, Kentish Town. The complainant deposed that he called on the defendant on the 6th of March to see his nephew (defendant's partner), who was not at home. After some conversation defendant told him he must leave the shop, took him by the arm, and turned him round. He then drew a damp handkerchief over his mouth and nose and pushed him out of the shop; the handkerchief smelt like putrid meat. He had scarcely reached Regent Street, a distance of a few yards, when he felt an extraordinary sensation in his head, and partially lost his senses. He met a friend, who assisted him to an omnibus, but how he reached home he could not tell. He felt as if he had been salivated, his eyes, nose and mouth, discharged profusely, sores broke out on his mouth, and he had been ill ever since.

Mr. Sandys, surgeon, described the symptoms in similar terms. Congestion of the brain and a severe cold might produce similar symptoms. He was not acquainted with any medicinal agent which would suddenly produce such an effect. The patient was much excited on account of a disagreement with his nephew.

The defendant absolutely denied the charge. He was not aware that the complainant was likely to call, and could not have had a handkerchief prepared as described. The case having been adjourned for the production of further evidence, it was proved that the defendant had no handkerchief in his hand at the time. Two medical witnesses proved the inconsistency of the offence and its alleged result, with any known facts or experience,

and the charge was dismissed by the magistrate. The affair, however. does not end here. The defendant having been injured by the publication of the first report of the case, and the charge having subsequently been proved to originate in a delusion, or something worse, further proceedings are in progress, the defendant and the plaintiff having changed places.

The exposure of such delusions is necessary for two reasons: first, to disabuse the minds of the swell mob as to the supposed value of chloroform for the purposes of their craft; and secondly, to frustrate attempts at imposition.

ANALYSIS OF THE BARKS OF RHAMNUS FRANGULA AND R. CATHARTICA.

BY M. BINSWANGER.

The bark of the stem of *Rhamnus Frangula* was examined in 1828 by *Gerber* (Brande's *Archiv. f. Pharm.* xxvi., p. 1.) and he obtained from the fresh bark by distillation:

A trace of volatile oil
Prussic acid

From 1000 parts of the dry bark:

Wax	5
Chlorophylle	17.5
Acrid bitter extractive matter, combined with a small quantity of phyteumacolla, malate, and muriate of lime	46
Uncrystallizable sugar	6
Yellow resinous colouring matter	27
Albumen	18.6
Gum, with a small quantity of malate, muriate, and sulphate of potash and calcareous salts	85
Extractive matter and phyteumacolla, sugar, malate of lime, and muriate of potash	45
Phosphate of lime and some alumina	21
Malate of lime and magnesia	20
Humus-like substance (recently formed)	110
Gum	145
Extractive matter (obtained by caustic lye)	75
Woody fibre	266
Loss	34
	1000

Gerber drew from his analysis the following conclusions:

1. That the unpleasant odour of the bark originates from a volatile oily substance.

2. That the bark contains Prussic acid, although the proportion of it is but small.

3. That the bitter acrid extractive matter is the active constituent, which can be obtained by adding acetate of lead to the decoction of the bark, decomposing the precipitate by sulphuretted hydrogen, evaporating the filtered liquid, and treating the extract thus obtained with absolute alcohol, by which the bitter matter is obtained in a pure state.

4. That the colouring matter is of a resinous nature, and rendered paler by acids, but deep red by alkalies.

5. That the bark differs from the *Cortex Pruni Padi* by the absence of tannin.

The results which I have obtained from the examination of the bark (of the stem and branches) of the *Rhamnus frangula* are:

1. *Volatile matter*, distillable with water, and which is the cause of the odour of the fresh bark.

2. *Fat, containing chlorophylle.*

3. *Rhamno-xanthin*, a yellow, crystallizable colouring substance, which can be sublimed, and acquires a beautiful purple red colour by alkalies.

4. *Tannin, which imparts to iron a blueish green colour*, and common tannin, which is gradually changed into gallic acid.

5. *A reddish-brown humus-like body*, very analogous to the *aporetin* of rhubarb, which is generated in the extracts by the gradual change of some other substance, very likely of the tannin.

6. *Amorphous resin, soluble in ether.*

7. *One or several resins, soluble in alcohol and insoluble in ether.*

8. *Bitter matter*, apparently of a resinous nature, and probably the cause of the purgative effect.

9. *A peculiar brown tasteless extractive matter*, soluble in water. It was obtained by precipitation from an alcoholic solution while cooling.

10. *Gummy extractive matter.*

11. *Amorphous sugar.*

12. Malic acid and malates.

13. Traces of chloride of potassium, sulphate of potash, phosphate of lime and magnesia, and traces of oxide of iron and silica.

The bark of the root contains a smaller quantity of fat without chlorophylle, but more rhamno-xanthin than that of the stem, and judging from the taste and the effects, the proportion of tannin is larger in the first. No other essential difference appears to exist between the bark of the different parts, as may be seen by the following summary:—

By successive treatment there were dissolved with

	Bark of stem.	Bark of root.
Ether (fat, rhamno-xanthin, tannin, resin) ...	3.0	0.5
Alcohol (resin, bitter matter, extractive matter, sugar, and a small quantity of tannin and colouring matter)	7.5	13.3
Water (gummy extractive matter, salts, &c.)...	21.5	21.2
Remained undissolved by the above solvents...	68.0	65.0
	100.0	100.0

The bark of the root and stem of *Rhamnus cathartica* yielded the following results.

1. *Fat containing chlorophylle.*

2. *Rhamno-xanthin.*

3. *Amorphous resin soluble in ether.*

4. *Tannin colouring iron brownish-green.*

5. *A dark-brown humus-like substance*, produced by the decomposition of some other substance, perhaps tannin.

6. *A crystallizable bitter matter* (rhamnus bitter) easily soluble in water, and with difficulty in alcohol.

7. *Brown extractive matter*, easily soluble in water, but with difficulty in alcohol.

8. *A small quantity of vegetable acid.*

9. *Amorphous sugar.*

If we compare this analysis with that of *R. frangula*, it will be perceived that some substances are common to both, but that there is a striking difference with regard to the *bitter-matter*, that of *Rhamnus frangula* is more of the nature of resinous than of extractive matter, and is very readily soluble in cold alcohol. The bitter matter of *Rhamnus cathartica*, however, is crystallizable, is soluble with difficulty in alcohol, and but very readily in water ; its taste also is different from that of *R. frangula*, being not disagreeable, but purely bitter. The difference in the medicinal effect of the barks probably depends on this difference between the respective bitter matters.—*Buchner's Repertorium*, 1849, No. 11.

COPY OF SPECIFICATION OF MESSRS. ATTWOOD AND RENTON'S PATENT FOR CERTAIN IMPROVEMENTS IN THE MANUFACTURE OF STARCH,

AND OTHER LIKE ARTICLES OF COMMERCE, FROM FARINACEOUS AND LEGUMINOUS SUBSTANCES.

Patent dated September 13, 1849.

Our improvements consist in effecting the separation of starch from the other substances with which it is combined in farinaceous and leguminous substances by a more expeditious process, and by the use of cheaper agents than those commonly in use. And in order that these improvements may be clearly understood, we shall, by way of exemplification, describe the mode in which we manufacture starch from rice, and point out those parts of the process which we claim as being new and of our invention. We take whole, or broken grains of rice, with or without the husk, or rice-flour, and throw them or the flour into a shallow or other convenient vessel. We then pour in a solution of lime and chloride of sodium (common salt) sufficient to cover the whole of the rice, that is to say, about twenty-six gallons of the solution to about 112lbs. of the rice. We make this solution by mixing slacked quicklime and chloride of sodium and water in the proportion of about 100lbs. of lime and 30lbs. of chloride of sodium to 500 gallons of water, or in any other like proportional quantities. But we do not confine ourselves to the above proportions, as other proportions might be used, though with less advantage. The solution thus made is to be allowed to settle, and the clear top liquor only drawn off for use. We let the rice remain thus submerged for about six hours, stirring it well every half-hour. We then draw off the liquid by means of suitable taps, and cover the rice with a fresh quantity of a similar solution; the rice is then exposed for six hours to the action of the solution, being well stirred every half-hour as before; after which the liquid is to be drawn off, when the rice is ready to be ground. The grinding is effected in the usual way, and the ground rice transferred to what is called a "rousing vessel," and covered with a quantity of a similar solution, as before-mentioned. The ground rice is then to be well stirred or roused for about two or three hours. From this vessel the rice is removed to a separating vessel or vessels, in which it is left to stand for about six hours, in order that the starch may be separated from the gluten with which it is combined. To save time, we generally perform the stirring or rousing process the last thing at night, so that the separation may be effected before morning. On examining the separating vessel or vessels, a thick or creamy matter is found deposited at the bottom, which is the starch mixed with a portion of fibrine, while the gluten floats near the top of the liquor. We then draw off the liquor as close as may be to the creamy deposit, and fill up again with cold water, which after a little time is also drawn off. The starch or starchy matter is now to be separated from the fibrine with which it is intermixed, in the usual way adopted by rice-starch makers. For the purpose of facilitating the separation of the starch from the fibrine in the water, we sometimes use a sliding or telescopic tube placed vertically over an outlet at or near to the bottom of the vessel, and so that the upper end of the tube can be gradually, and from time to time depressed, until the whole of the starch floating in the water has been run off from the fibrine which falls towards the bottom. The moist starch is run into a receiving or filtering vessel, made with a false bottom or side, consisting of one or two or more plates of perforated zinc or woven wire, or other suitable

material, with an intermediate sheet of cotton, linen, or some other like fabric, the whole being carefully fastened, so that none of the starchy matter may escape through. From between the bottom or side of the vessel and the perforated zinc plate or plates, or other suitable material, there is a pipe which leads to an exhaust pump. On the starchy matter being run off into the receiving or filtering vessel the pump is set to work, when it draws off all or most of the excess of water with which the starch is charged, but brings off also along with the water a portion of starch which the meshes of the false bottom or filter have failed to intercept. The pump therefore is made to empty itself into a long shallow trough, or a series of shallow troughs communicating with each other, so that the starchy water may have to run a long distance before it is finally allowed to run to waste, and so as during its progress to deposit the whole of the remaining starch. For this purpose the trough, or series of troughs, should be placed so as to cause a continuous but very gentle flow of the water, say at an inclination of about one inch in 100 feet. The width of the trough or troughs should be in proportion to the quantity of water holding the starch in suspension, and it will be better if the depth does not exceed four inches. We have found in practice that in a run of about 300 feet, the water will come off perfectly clear and free from starch. The whole of the starch which has been thus separated and collected is now ready for what is called "boxing," after which it is to be dried in the usual manner. The gain so far is such, by the means and methods we have described, that is to say, by the use of the lime and salt solution and processes aforesaid, that we can advance the manufacture of starch in about forty-eight hours to the same stage which it now takes about 132 hours and upwards to arrive at and obtain, besides an increase of from six to seven per cent. in the quantity of starch produced. The starch is, we believe, also much purer than any obtained by means of a caustic alkaline, or acid solution, and fitted for all purposes to which wheaten starch produced by fermentation is usually applied. We prefer using the solution of lime and salt cold, because more lime can be dissolved in cold than in hot or warm water, and because also the risk of fermentation is thereby diminished; but we do not confine ourselves to the use of the said solution at any particular temperature. Starch of a good quality for some purposes, though not for all, may also be made, by using solutions of lime alone in the manner before specified; in which case, however, we make the solution of lime with cold water, and use it in that state only, and confine our claim to the use of it in that state. The same lime and salt solution as aforesaid may also be employed with the like good effect in manufacturing starch from rye, peas, beans, and other leguminous substances, and in the preparatory steps also of the manufacture of other like articles of commerce, such as dextrine or British gum.

Claims.—1. The employment of a solution of lime, in conjunction with chloride of sodium or salt in water, in the manufacture of starch and other like articles of commerce, and that either before or after the rice is ground, crushed, or broken.

2. The employment, in the manufacture of starch, of lime-water prepared from lime and cold water.

3. The employment, in the manufacture of starch, of long shallow troughs, in connection with an exhaust pipe, for the purpose of depositing from the water discharged by the pump any remainder of starch.

ON WONGSHY, A NEW YELLOW DYE.

BY W. STEIN.

Under the name of *wongshy*, a new yellow dye has been imported from Batavia into Hamburg. It consists of the seed capsules of a species of *gentiana*. They are from one and a half to two inches long, and half-inch broad, oblong ovate, furnished with the dried six-lobed calyx at one end, and tapering to a point at the lower end. They contain each more than one hundred seeds. Their surface is irregularly undulating, with from six to eight longitudinal ribs ; the shell is hard and brittle ; the odour like honey and saffron. The microscope detects in the inner cells of the seed-coats a somewhat greenish-yellow colouring matter, and in the external cells a purplish-red colouring matter.

To water they yield a yellow colour—to alcohol a fiery reddish-yellow, and to ether a brownish-yellow colour, like wine. In the fat oils the colouring matter is insoluble.

Extract of wongshy with warm water dyes wool, without the previous use of a mordant, of a beautiful orange colour ; the same with an aluminous mordant ; but less beautiful, with the chloride of tin. Silk, without a mordant, becomes fiery yellow, like gold. Cotton is best dyed in it, with the tin mordant. The colours resist the influence of soap. By previously using lime water as a mordant, and soaking in the boiling liquid, a beautiful yellow colour is obtained. By the addition of potashes and caustic potash the colour may be variously modified. Acid baths change these colours to Aurora red. The wongshy colouring matter acts as a weak acid: it combines with alkalies and alkaline earths, and may be separated from these combinations unaltered, and of a cinnabar-red colour, and is no longer soluble in water, and but slightly so in alcohol. The fruit yields five per cent. of ashes.—*Pharm. Central Blatt.*, Feb. 27, 1850.

SOLUBILITY OF IODINE IN COD-LIVER OIL.

BY FLEISCHMANN.

In order to discover in what proportion iodine is soluble in the fatty oils Fleischmann rubbed down one and a half gr. of iodine with a few drops of *ol. jecoris aselli album*, and found that it soon dissolved. The oil at first assumed a dirty brown colour ; but upon the addition of five ounces more oil, this colour disappeared, and no difference could be observed between the pure oil and this mixture.—*Buchner's Repertorium*, 1849, No. 11.

OLEUM HYOSCYAMI INFUSUM.

BY OVERBECK.

This is prepared as follows :—The best, fresh, green herb of henbane is dried at the lowest possible temperature, then triturated into a coarse powder, which is mixed with as much spirit of wine as will enable it to ball together into lumps [*dass es sich zu Klumpen zusammenballt*]. The whole is left standing for twenty-four hours in a covered vessel, and frequently shaken. It is now placed, rather loosely, on a funnel, the lower opening of which is closed with cotton or tow, and the requisite quantity of warm olive-oil poured over it. This runs through loaded with the active principles of the henbane extracted by spirit of wine. Lastly, the powder is pressed, and the whole quantity of the oil heated in the vapour-bath in order to drive off the alcohol. It is then allowed to deposit, and afterwards decanted. In this manner an oil of the most intense blackish green colour, and the strongest disagreeable narcotic henbane-odour is obtained, which sufficiently indicates its activity.—*Pharm. Central Blatt., für* 1850, p. 112.

ON THE BITTER MATTER (OR CATHARTIN) OF RIPE BUCKTHORN-BERRIES.

BY DR. F. L. WINCKLER.

Dr. Winckler gives the following description of the pure bitter matter, or *cathartin*, obtained from the ripe berries of *Rhamnus catharticus*. It forms a pale golden yellow perfectly combustible powder, which is soluble in any proportion in water and spirit of wine, and tolerably soluble in alcoholized ether, but scarcely so in pure ether. The watery solution is clear and almost colourless, tastes very disagreeable and permanently bitter, like a solution of the bitter matter of aloes. It does not affect litmus or turmeric paper, but reacts so strikingly upon a solution of chloride of iron and acetate of lead, that the peculiar character of this bitter matter is easily established by these substances. The first produces in the solution an instantaneous dark brownish green colour without precipitate; acetate of lead and also alkalies and ammonia colour it (without precipitation) intensely brownish yellow like gold, which colour is completely destroyed by acids. By this relation to acetate of lead, the absence of tannin, which might have been suspected after the reaction with chloride of iron, is satisfactorily proved. It could also not be discovered by means of any other test. Heated over the spirit-flame cathartin melts at a slight heat into an oily liquid, becomes brown with a simultaneous development of a peculiar smelling vapour, ignites, and leaves behind a very voluminous coal, which is entirely combustible, though with difficulty. A compound, insoluble in spirit of wine, which he obtained from the solution of the still impure bitter matter in spirit of wine of ninety-five per cent. was converted into pure grape-sugar, the aqueous solution of which (twenty grains of sugar in two ounces of distilled water) passed in a short space of time, upon the addition of well-washed yeast (at +25° to 28° R) through the process of fermentation.

Winckler concludes from this that the Rhamnin which Fleury obtained (see *Pharm. Central Blatt.*, 1842, p. 220) from the unripe berries becomes changed in the ripe fruit into cathartin and grape-sugar, and can, therefore, only be obtained from the pulp and juice of the unripe berries.—*Jahrb. für Prakt. Pharm.*, Oct., 1849.

BELGIAN SORTS OF WHITE LEAD.

The different sorts of white lead manufactured in Belgium are:—1. *Kremser white:* pure carbonate of lead (*bleikalk*).—2. *Venetian white:* a mixture of equal parts, by weight, of heavy spar and carbonate of lead.—3. *Hamburg white:* two parts of heavy spar, and one-part of carbonate of lead.—4. *Dutch white:* three parts of heavy spar, and one part of carbonate of lead. In order to deprive the common white lead of the yellow shade, it is often mixed with indigo or charcoal, by which it assumes a blueish tint. —*Pharm. Central Blatt., für* 1850, p. 156.

ON THE USE OF RESIDUAL CINCHONA BARK IN THE MANUFACTURE OF SULPHATE OF QUININE.

BY SCHLOTTFELDT.

The author states that cinchona bark, which has been employed in making a decoction of bark, contains quinine. He obtained six drachms of sulphate of quinine (two drachms were procured in white crystals at the first crystallization), from the residue of five and a half pounds of uncoated yellow bark, which had been employed in the manufacture of *Ext. Chin. reg. frigide parat.*—*Pharm. Central Blatt*, for 1850, page 160.

ON ARISTOLOCHIA CLEMATITIS.

BY F. L. WINCKLER.

Winckler gives the following notice of the volatile oil and bitter matter of this plant:—The *distilled oil*, after the mucus has subsided, is light orange yellow. With dry iodine it becomes slightly hot. In the air it assumes, after a short time, a deep colour, and changes its odour, becomes soft like resin, and has then the smell of balsam of copaiba. Four pounds of the root distilled by steam yielded 120 grains of clear oil.

From the residual root the *bitter matter* was extracted by ammoniated water, and the solution mixed with diluted sulphuric acid, whereupon the bitter matter was almost entirely precipitated in flakes. This precipitate was dissolved in alcohol of eighty per cent., and the solution having been nearly decolourized by animal charcoal was evaporated, by which an amorphous light brown yellow residue was obtained. This was deprived of resin by frequent solution in cold water. In this condition this substance readily attracted water in consequence of the salts contained in it. It is soluble in water and in alcohol, but in ether it was insoluble. It possessed an exceedingly bitter taste. Winckler thinks that it is identical with the bitter matter contained in Rad. Serpentariæ (*Aristolochia Serpentaria*). It is neutral, and is precipitated by basic acetate of lead and nitrate of silver.—*Pharm. Central Blatt., für* 1850, p. 110.

ON THE PURIFICATION OF HONEY.

BY ANDRÉ V. HIRSCHBERG.

In the *Archiv. d. Pharmacie* xxix. p. 308, the following method of purifying honey is recommended by André:—Twenty-five pounds of honey are to be diluted with half that quantity of water and boiled, with a pulp obtained by stirring three sheets of white blotting-paper with water, over a slow fire, till the pulp is resolved into fine fibres. When cold, the whole is placed on a woollen previously moistened filtering-bag, through which the honey soon runs off as clear as wine. The residual paper-pulp is then washed, and the dark wine-yellow liquid thus obtained evaporated in the vapour-bath. The thus obtained honey answers, according to the observations of Hirschberg, all purposes for which a faultless, purified honey is required.

UNGUENTUM POTASSII IODIDI.

BY A. W. BRIEGER.

From a number of experiments made by Brieger, with regard to the preservation of this ointment, he concludes that 1. both Carbonated and calcined magnesia not only do not prevent this ointment from becoming yellow, but rather promote the decomposition of the iodide of potassium; 2. Carbonate of potash is better adapted for this purpose; but, 3. A solution of caustic potash is more effective, a few drops being sufficient to preserve from four to eight ounces of ointment for many months without becoming yellow, or to restore the white colour to such as had already become yellow.—*Jahrbuch. für prakt. Pharm.*

ANALYSIS OF THE SEEDS OF THE WHITE POPPY.

BY SACC.

Sacc has examined the seeds of the white poppy (*Pavot blanc variet. à yeux ouverts*). The plant had grown in the domain of Colombier, near Neufchatel, ninety meters above the level of the sea, on a *chalky clay soil* of

brown colour, and the fruit was gathered in 1838. These seeds contained, after subtracting 3.0292 per cent. of hygrometric water :

Expressed oil	45.1166
Coloured oil extracted by alcohol	9.4979
Volatile substances	3.5450
Pectin	23.2636
Protein matter	12.6448
Woody matter	5.9321
	100.0000

The *entire seeds* lost, on being dried in a current of carbonic acid : 6.8618 per cent. water, and the dried seeds, yielded

	I.	II.	Mean.
Carbon	62.1790	62.2886	62.2338
Hydrogen	9.1549	9.2478	9.2014
Nitrogen	3.5829	3.6010	3.5924

The oil-cake yielded:—

I. *The rough expressed Cake.*		II. *That exhausted by Ether.*	
Carbon	47.7468	Carbon	42.2728
Hydrogen	6.7582	Hydrogen	6.0418
Nitrogen	5.9723	Nitrogen	7.6441

The oil in the anhydrous state contained :

				Average.
Carbon	76.7409	76.6220	76.5207	76.6279
Hydrogen	11.5027	11.6362	11.7599	11.6329
Oxygen	11.7564	11.7418	11.7194	11.7392

The undried seed left behind 5.3897 per cent. ashes, the dried seed 7.0002 per cent. The moist rough oil-cake 8.6599 per cent, the dried ditto 10.58675 per cent., the dry cake exhausted by ether 13 2031 per cent. For the analysis of the ashes the seeds were pressed, the oil-cake incinerated and burnt. 100 parts of the ashes contained :—

Silica	5.20	4.85	4.46	4.84
Sulphuric acid			1.99	1.99
Phosphoric acid	37.51	38.11		37.81
Magnesia	4.51	4.15		4.33
Lime	28.00	28.15		28.08
Soda			4.47	4.47
Potash			0.82	0.82
Carbonic acid				17.66
				100.00

Ann. de Chim. et de Phys., 3 sér., t. xxvii., pp. 470—490.

IRIDESCENT PAPER.

BY A. WAGNER.

Eight parts of gall nuts, five parts of sulphate of iron (as free from oxide as possible), one-part of sal ammoniac, one-part of sulphate of indigo (blue pot), and one-eighth part of gum arabic, are to be boiled with water, and preserved in a well-closed vessel. If paper washed with this decoction be exposed to the influence of ammoniacal gas, it becomes covered with colours like those of blue steel. Some tints are, however, easily rubbed off. The addition of sulphate of indigo in sal ammoniac, serves only to protect the protoxide of iron contained in the ink from a higher degree of oxidation.—*Pharm. Central Blatt., für* 1850, p. 156.

JUTE; CORCHORUS CAPSULARIS, L.

BY SIR WILLIAM JACKSON HOOKER, D.C.L., F.R.S.A.

The plant belongs to a natural family (*Tiliaceæ*) eminently distinguished for the strong and useful fibre of its bark: the lime-tree is a familiar example. Of the genus *Corchorus*, thirty-six species are enumerated by authors, chiefly inhabitants of the tropics or of warm countries, both in the old and in the new world. The generic name (κόρχορος) was applied by the ancients to some common potherb, and particularly to this genus, of which the most common and best known species (*C. olitorius*) is employed as a potherb, especially among the Jews, and hence its name *Olus judaicum*, according to Avicennes. The character of *Corchorus*, as given by M. De Candolle, is "*Cal.* 5-sepalus deciduus. *Pet.* 5. *Stam.* plurima. *Stylus* subnullus. *Stigmata* 2—5. *Capsula* subulæformis aut rotunda, 2—5-valvis, 2—5-locularis, valvis medio septiferis. *Semina* biserialia."

Most of the species have an elongated or pod-like fruit (hence one species is named *C. siliquosus*); but, in the present instance, the fruit is nearly globose, and more like the usual form of a capsule, from which circumstance it has received the appellation of

Corchorus *capsularis;* capsulis subglobosis depressis rugoso-muricatis glabris foliis oblongis acuminatis serratis, serraturis infimis setaceis. *Linn. Sp. Pl.* p. 746; *De Cand. Prodr.* I. p. 505; *Wight Ic. Pl. Ind. Or.* 1. f. 311. Ganja sativa, *Rumph. Amb.* 5, p. 78, f. 2.

It is an annual plant, and a common weed in the East Indies, much cultivated in Bengal (Dr. Roxburgh says in China also) during the rains, for the fibres of its bark, of which the "gunny," or rice-bags, &c., are made. Roxburgh gives the Bengalese name as "*Ghinalta pat.*" To this country, however, it is certainly imported under the more familiar name of *Jute.* Nevertheless, Dr. M'Culloch, in the edition of his *Commercial Dictionary*, for 1846, says that "*Jute* consists of the fibres of two plants, called *chouch* and *isbund*, *Corchorus olitorius* (the potherb above alluded to) and *C. capsularis.* These are extensively cultivated in Bengal, forming, in fact, the material of which gunny bags and gunny cloth are made. The fibre fetches nearly, though not quite, as high a price as *Sunn* (*Crotalaria juncea*). It comes into competition with flax, tow, and codilla, in the manufacture of stair and other carpets, bagging for cotton and various goods, and such-like fabrics, being extensively used for those purposes in Dundee. But it is not suitable for cordage and other articles into which hemp is manufactured, from its snapping when twisted, and rotting in water. The quantities imported and the prices have fluctuated very greatly during the last dozen years; but from £12 to 15 a ton appears to be a fair average. When first introduced into this country in 1815, the price of *Jute* varied from £35 to £40 a ton. It was then, however, very little known, and did not in fact begin to come into anything like general use as bagging till 1827 or 1828."—*Hooker's Journal of Botany.*

CHINESE "RICE PAPER," OR "BOK-SHUNG."

Thanks to our most obliging friend, Capt. Wm. Loring, R.N., who has put us in communication with several intelligent gentlemen now resident in China, we are in a fair way of obtaining correct intelligence relative to many interesting scientific objects, and of having our doubts solved on some important botanical matters. J. H. Layton, Esq., H. B. Majesty's Consul at Amoy, China, has most kindly sent us, not only excellent specimens of the *pith*, from which the so-called *Rice-paper* is formed, but a

model of the knife used in cutting it, and, what is even of more value, the following information:—

The substance, commonly called *Rice-paper* by the Chinese, is made from the pith of a plant or tree, which grows principally in the swampy grounds in the province of *Sam-swi*, in the northern part of the island of Formosa, where it is said to form large forests. The bark and rind are, previous to exportation, stripped from the pith, which is then called *Bok-shung*.

The iron knife commonly used for cutting this pith weighs about 2½lbs., and is of the roughest and coarsest workmanship,* and perhaps not one blade in twenty is sufficiently well tempered to be advantageously used. In cutting, the knife is kept quite steady, the cylindrical pith being moved round and round against the edge of the knife, which is just inserted into the substance, and thus a leaf or sheet is formed, resembling the most delicate paper, but rather thick in substance. When brought quickly from the workman's hands, the paper is in a damp state. It may have been rendered so, in order to facilitate the smoothing and pressing.

At Chang-chew, the large city of which Amoy is the sea-port, there is only one man who can cut this paper. This person ran away from his master in Formosa, and refuses to teach his trade except for a premium of sixty dollars.

It is said that there is a neat method of joining this paper when broken, and that it is chiefly made from the smaller pieces of the *Bok-shung*, and that the larger pieces are used in medicine in the same way as Epsom salts.

It is in vain to conjecture, from the pith alone, to what plant or tree this exquisitely-beautiful substance belongs. The vulgar opinion still generally prevails, that, because it bears the name of *Rice-paper*, it is manufactured from rice ; but the slightest inspection with a microscope exhibits the exquisitely-delicate medullary portion of a dicotyledonous stem. Again, from an affinity with the well-known *Shola*† of the East Indies, many have supposed, and even Chinese travellers have declared, that *Rice-paper* is made from this, the *Æschynomene paludosa*. But a comparison of the two will clearly show the difference. Both are light and spongy ; but the *Shola* is far less delicate than the *Bok-shung*, and is always exported "peeled," the external coatings being removed ; whereas, the *Shola* is always sent covered with its thin brown bark. A Chinese drawing of what is said to be *the Rice-paper plant* is in possession of Dr. Lindley ; but neither flower nor fruit is represented. Some have conjectured this to be a Malvaceous plant, others Araliaceous. We have seen in the branches of the common fig, *Ficus Carica*, a copious medulla, very much resembling, in its texture and pure whiteness, that of the *Bok-shung*.

We have the gratification of knowing that our Consul at Amoy will use his best endeavours to procure flowering specimens of the plant itself. —*Hooker s Journal of Botany.*

* The model (of wood) sent would indicate this. It has a very broad, straight blade, and a short, straight handle, and is more like a small bill-hook (wanting the hook) than a knife.

† Of which floats and buoys for fishermen, and the very light hats of Sincapore, are made.

BOOKS RECEIVED.

The Use and Abuse of Alcoholic Liquors in Health and Disease. Prize Essay. By William B. Carpenter, M.D., F.R.S., &c. London : Charles Gilpin, Bishopsgate Street ; John Churchill.—Edinburgh : A. and C. Black.—Dublin : J. B. Gilpin. 8vo, pp. 282.

To be noticed next month.

Electric Telegraph Manipulation. By Charles V. Walker.—Will be noticed next month.

A Microscopic Examination of the Water Supplied to the Inhabitants of London and the Suburban Districts; *with Coloured Plates, exhibiting the Living Animal and Vegetable Productions in the Water supplied by the several Companies, &c. &c.* By Arthur Hill Hassall, M.B., F.L.S. London: S. Highley. Pp. 66.

The London Examiner; *Monthly Review and Statistical Journal of Practical Medicine.* Nos. 1 and 2. London: Palmer, Paternoster Row.

The Chrono-Thermalist; *or, People's Medical Enquirer.* Nos. 1 and 2 London: C. Gilpin, Bishopsgate Street.

The General Malaria of London, *and the Peculiar Malaria of Pimlico, investigated.* By Andrew Ure, M.D., F.R.S.

TO CORRESPONDENTS.

Amator Scientiæ (Croydon).—Most tinctures throw down more or less deposit on keeping, which may be separated by filtration. We are not aware of any method of preventing the deposit.

C. (Northampton).—The oil of vitriol test will not distinguish good cod-liver oil from that which is adulterated or bad; but it shows whether liver-oil be present or not.—See vol. viii., page 370.

D. A. (Portsea).—(1.) De Valangins solutio solventis mineralis.—See vol. viii., page 395.—(2.) *D. A.* gives the following formula for green ink: ℞ Prussian blue, ʒiiiss; gamboge, ʒiii; powder and mix, then add mucilage, ℥ii.; distilled water, ℥x. A little oxalic acid is sometimes added.

T. Price.—We doubt the fact.

W. H. T. (Mile End).—Common alum *pure.*

A Member (Thirsk).—We cannot account for the effervescence except on the supposition that the ingredients were not in the first instance completely combined.

J. B. (Manchester.)—(1.) This question is answered in vol. viii., pages 463, 566—9, and in many other places.—(2.) We hope it will.—(3.) The delay arises from circumstances not under our control.—(4.) The local secretary would give the information if applied to.

M. P. S. (Reading.)—The labels, although liable, according to the strict letter of the law, might escape under the general instructions of the Board.

B. (Cheltenham).—The label incurs liability to stamp duty on account of the words "Prepared only by," which imply an "exclusive right or occult secret or art."—See vol. viii., page 161.

Ejos.—(1.) The subject has not escaped our notice, and we have directed the attention of the parties concerned, to the defects and inconsistencies requiring amendment. Finding that it was positively determined not to interfere with this branch of the subject at present, it was useless to agitate the question further.—(2.) The other subject will be alluded to in the Report of the Council at the Annual Meeting.

Scrutator is entirely mistaken in regard to some of his "facts." Nevertheless, we are obliged to him for his communication, and shall be further obliged if he will attend the Annual Meeting, and repeat boldly like a man the substance of his letter.

M. P. S. (Norwich.)—The suggestion has already been duly considered. The change would be attended with some inconvenience, although probably desirable in other respects.

D. G. T. (Newport.)—(1.) Indentures of apprenticeship are not absolutely necessary, provided the needful time has been properly occupied in learning the business.—(2.) It would be necessary to pass the examination, the study preparatory to which may be followed in the country, or wherever it may be most convenient.—(3.) The information may be had on application with name and address.

Manchester.—Vanilla.—See vol. vii., p. 73, vol. viii., p. 275.

The Sale of Poisons.—Mr. Pegg, of Birmingham, gives the following account of an escape:—"A few days ago, a young man came to our shop for a small quantity of arsenic, for the purpose (as he stated) of poisoning rats; not knowing him personally, and his manner appearing rather strange, I suspected he wanted it for an improper use, and fearing he might go to some other shop and procure it, I sold him a substitute, which fortunately saved his life, for in a short time afterwards a person came in great haste to know what he had been for, stating that he had swallowed the whole of it. I have since heard that a quarrel with a young lady was the cause of his wishing to commit suicide."

Mr. Horsley (of Ryde) objects to our criticism on his process for purifying water, observing that he does not confine himself to oxalic acid or an oxalate, and that caustic barytes is by no means expensive; and as regards any excess, supposing there should be any, it remedies itself by absorption of carbonic acid from the air where purified water is kept in stock.

F. R. (Norwich).—Probably the precipitate is caused chiefly by the mixture of the tincture with the infusion.

A. P. S.—No action would take place.

Alpha.—(1.) Oxalic acid.—(2.) No.

Pharmacien.—(1.) Oxalate of ammonia does not decompose sulphate of quina, consequently the proposed process would be inapplicable.—(2.) Tincture of Arnica is made, according to the Prussian and Hamburg Pharmacopœias, by macerating ℥iss. of Arnica flowers in ℔j. of spirit. There is no authorised formula for the preparation in this country.

Incognitus.—If the statement be correct there can be no spirit present.

Associate (Bath).—There is no simple method of determining the question by the application of a test.

W. W. R.—The proposed method of drying plants has been already published in this Journal, vol. iv., page 83.

Puros.—(1.) Nitrate or chloride of lithia gives the deepest red colour to flame.—(2.) Binoxide of manganese is the most economical source for oxygen gas, but the mixture of chlorate of potash and manganese is more frequently used in the preparation of small quantities.

J. W., A. P. S.—By fat varnish is meant a varnish the menstruum of which is a drying oil, and not spirit. Gold-size is a varnish of this kind.

Minimus.—(1.) Syrup of gum acacia.—(2 and 3.) The chlorinated lime of the Pharmacopœia is generally considered to consist of chloride of calcium and hypochlorite of lime, the chlorine in the latter compound being in combination with oxygen as an acid.—(4.) Yes.—(5.) There is much room for improvement in chemical nomenclature.

Eg. No.—The equivalent numbers are determined by the analysis of well-defined compounds, the constitutions of which are inferred from analogy; but the results of analyses do not always precisely agree, and different views are sometimes taken by Chemists with reference to the constitution of compound bodies; hence the discrepancies in regard to the numbers referred to.

Anatomist.—We presume it is prepared by levigation, a process which would be performed by any one accustomed to the preparation of paints.

Erratum.—Last number, page 491, line 3 from the bottom, *for* "or," *read* "and." To W. W. (Stratford).

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the Editor, 338, Oxford Street, before the 20th of the month (if Answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. IX.—No. XII.—JUNE 1st, 1850.

THE ISINGLASS FRAUD.

In our last number we published an article by Mr. Redwood, in which an ingenious and systematic method of adulterating isinglass was exposed.

Messrs. Dawson and Morris, the parties implicated, being naturally desirous of rebutting this statement, have called in the aid of Messrs. Richard Phillips and John Thomas Cooper, whose report will be found in another part of this number. This is a course not unfrequently adopted in such cases, and sometimes it answers the purpose intended, inducing a conviction that the imputation was unfounded.

In the present instance the result is not satisfactory, although the two professors have endeavoured to give the most favourable colouring to the statement on behalf of their clients.—See page 567.

When we look back at the pungent articles by Mr. Richard Phillips, which we had the honour of publishing in 1842-3, entitled "Illustrations of the State of Pharmacy in England," in which he severely handles those Chemists whose preparations he found to be not quite so pure as they ought to have been, we confess that we are not a little surprised to find him figuring as the Chemical Advocate of his present ingenious clients.

THE ALLEGED ADULTERATION OF MORPHIA.

Subjoined is a denial by Messrs. Heathfield and Burgess of the imputation brought against them by Messrs. Wright. This case appears to demand but little comment. We may, however, remark that however desirable and proper it may be to expose fraudulent adulterations, those who bring forward such imputations should be particularly careful, before they do so, to be prepared with conclusive evidence of the accuracy of their statements.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—We have not received any reply from Messrs. Wright on the subject of the morphia furnished by us, and stated by them to have been impure; we therefore desire to inform you that both the acetate and muriate of morphia were perfectly pure when they were delivered to Messrs. Wright, and we are bound to believe that they have not undergone any scientific examination at all.

We are, sir, your most obedient servants,

Heathfield and Burgess.

Frinces Square, Wilson Street, Finsbury, May 16, 1850.

THE EXHIBITION OF THE WORKS OF INDUSTRY OF ALL NATIONS.

When this subject came before the Council it was the opinion of all present that the undertaking had some claims on the Pharmaceutical Society. The Exhibition is projected as a means of encouraging an advancement in the arts and manufactures by means of a creditable and honourable competition in the excellence of products. Chemistry and Pharmacy are noticed in a prominent manner in the programme

issued by the general committee, and a special committee is appointed for superintending scientific arrangements on these and similar subjects.

The Pharmaceutical Society having for one of its objects the advancement of the art and science of Pharmacy, and enjoying a Royal Charter of Incorporation in which this object is especially recited, a disregard of the appeal of His Royal Highness Prince Albert to the commercial and scientific industry of Pharmaceutical Chemists, would not, we think, have been in accordance with the character of the Society.

The Council, however, instead of voting a sum of money on the occasion, considered it more advisable, under existing circumstances, to recommend the grant, and to leave the decision to the Members at large. The sum suggested by the Council was fifty guineas, and a notice to this effect was inserted in the annual circular to the Members.

An objection having been taken by some Members to the amount proposed, and a question having been raised as to the propriety of making the grant, the Council reconsidered the subject, and reduced the sum recommended to twenty guineas.

It appeared, however, from the sentiments expressed at the Annual Meeting, that, while a few Members had doubts as to the propriety of the measure, others were desirous of increasing the grant, and volunteered to add further contributions for this purpose. A large majority supported the recommendation of the Council, and the amount was almost doubled by the voluntary subscriptions of the Members present.

It will be a question for consideration in what manner the Chemical and Pharmaceutical portion of the exhibition is to be managed. We think a place should be appropriated to the Pharmaceutical Society, in which the specimens furnished by the Members should be arranged. By this plan each individual will have credit for the result of his own skill and industry, and the Society will occupy its proper position as an institution promoting the advancement of the art and science of Pharmacy.

THE PROGRESS OF THE WATER QUESTION.

This progress is rather of a negative character. The Bills of the two rival companies (the Watford and Henley) were thrown out at the second reading. The Government appears to be in a state of paralysis in reference to this question, waiting for the report of the Board of Health. The Board of Health prudently waits to see whether the Government Interment Bill will be carried, before hazarding the proposal for another Government Commission. During this state of suspense no efforts are made to coerce the delinquent water companies, even for temporary purposes. The supply of unfiltered water from Hungerford or Waterloo Bridge has almost ceased to be a topic of conversation. Nothing but an extreme course is sufficiently exciting to attract attention. Any proposal for reform, short of a chimerical utopian scheme, requiring "Alladin's lamp" for its accomplishment, fails to cause any excitement or stimulate the public. The estimated amount of water required is as much in excess as the quantity supplied falls short of the common-sense medium, and the pretended *microscopical classification* of the waters of the Metropolis, by Arthur Hill Hassall, is an effort of imagination which was unrivalled in comic ingenuity until the illustration in *Punch* left it far behind.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

THE CONVERSAZIONE

Given by the President, Mr. Peter Squire, at the house of the Society on Wednesday evening, the 15th of May, was attended by a very numerous company of medical and other scientific men, and of Members and Associates of the Society.

The arrangement of the rooms on this occasion was somewhat different from that which had been previously adopted. Efficient provision was made for the reception of hats and coats, an accommodation which had not been afforded to visitors since the confusion which occurred in the distribution of those appendages a few years ago. The Council-room was made one of the principal reception rooms for visitors, and refreshments were dispensed in the upper part of the house. By these means, and also by an alteration in the lecture-room, increased space was provided for the company, and for the display of objects of interest.

There was a large collection, in different parts of the house, of rare medicinal and other plants, in full vegetation, which served to decorate the entrance-hall, the council-room, and the library. Most of these plants were from the gardens of the Royal Botanical Society in the Regent's Park. Among them were, the *Quassia excelsa*, *Guaiacum officinale*, *Tamarindus Indica*, *Saccharum officinarum*, *Eugenia pimenta*, *Piper nigrum*, *Smilax sarsaparilla*, *Cycas revoluta*, *Coffea Arabica*, three different species of *Thea*, &c. &c. Each of these plants was surrounded by the products obtained from it.

Some very beautiful representations of flowers, modelled in wax, attracted much attention. These included the *Amherstia nobilis* and *Victoria regia*, modelled by Miss Tayspill, and several groups of flowers by Mrs. Peachy, wax-modeller to the Queen.

There were also several dried plants, especially a collection of ferns from Madeira, from the collection of Dr. Ross; a specimen of the rose of Jericho, or holy rose; and one of the *Mesembryanthemums*, which, like the rose of Jericho, in the dried state, is closed up like a ball, but expands in a few minutes when laid on the surface of water.

Among the chemical specimens were a fine piece of crystallized calomel from Messrs. Howards, of Stratford; crystallized sulphate of iron from Mr. Huskisson; piperine and red prussiate of potash from Mr. Morson; a new principle obtained from white balsam called myrospermin from Dr. Pereira; and a very interesting series of products illustrating the manufacture of acetone and pyroxylic spirit from Messrs. Davy, Macmurdo & Co., prepared by Mr. Scanlan.

The President was indebted to Captain Shea for some objects of curiosity, including specimens of Chinese carving on cannel coal, edible bird's nest, and some foreign fruits; and to Mr. Deane for a curious Chinese tea-pot, and specimens of Chinese rice and rice vermicelli.

Among the applications of Chemistry to the arts, were specimens of electrotyping by Mr. Johnson; Daguerrotype and Callotype drawings

by Mr. Mayall and Mr. Malone; coloured glass from Mr. Phillips; ornamental glass coated with silver by the process of Messrs. Varnish and Co.; a new kind of mirror in which the glass is coated with an amalgam, containing silver and platinum in the place of tin, from Mr. Kidd; and silexalated marble from Mr. Shove. The last-named article is, as the name would import, a combination in which glass is a principal component. It is capable of the most faithful delineations of genuine marble, and is applicable for the interior or exterior embellishment of buildings.

The subject of ventilation having recently attracted much public attention in connexion with sanitary measures, the different contrivances for effecting that object, which were exhibited by the inventors, formed a prominent topic of conversation; and it was curious to observe with what convincing arguments the proprietor of each plan demonstrated its capability of superseding all others. Here were Arnott's, Sheringham's, Nayler's, Baillie's, and other ventilators, some of which were in operation. Dr. Chowne's syphon ventilator had many observers, and not a few who were puzzled to comprehend its mode of action, which appeared to be very efficient. In the lecture-room was fixed one of Mr. Pierce's pyro-pneumatic warming and ventilating stoves, which also seemed to perform its intended office very well. This stove is intended for the supply of fresh air as well as heat to the room in which it is placed, and for the removal of the air which has become vitiated. The fire-place is constructed of fire clay, through which there are tubes for conveying air brought through a channel from without the building. This air is warmed by passing through the heated tubes, and in this state is diffused into the apartment, while at the same time the open fire of the stove consumes and carries off the air which has been vitiated by respiration, &c.*

In addition to the foregoing there was a case of minerals from Mr. Tenant; diseased cereals from Mr. Bentley; an antique pestle and mortar, dated 1633, from Mr. Garle; electro-magnetic apparatus from Mr. Griffin and from Mr. Knight; stoneware chemical apparatus from Mr. Stephen Green; resin of guaiacum in tears from Messrs. Baiss Brothers; a beautiful painting of the foxglove and other flowers, by Mrs. Withers, from Mr. Morson.

In the centre of the lecture-room was exhibited Mr. Wilkins's splendid dioptric light, designed for lighthouses; and in each of the rooms were several microscopes applied for the elucidation of subjects interesting to those engaged in the practice of medicine or pharmacy. Relating to microscopic objects was a series of models illustrating the forms and relative sizes of different kinds of starch grains, greatly magnified, from Dr. Pereira.

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* We are informed that this stove was the invention of Mr. Cundy, who has taken out a patent for it, and who considers himself aggrieved by the way in which Mr. Pierce has brought out his stove.

PRESENTATION OF A TESTIMONIAL TO MR. REDWOOD BY HIS PUPILS.

On Saturday, the 11th of May, a large number of those who are, or have been, pupils in the Laboratory of the Society, assembled in the library, and, having requested the attendance of Mr. Redwood, presented to him a testimonial engrossed on vellum, accompanied by a very handsome tea-service of plate. Each of the pieces of plate bears the following inscription:—"Presented to Theophilus Redwood, Esq., Professor of Chemistry and Pharmacy to the Pharmaceutical Society of Great Britain, as an expression of the high estimation in which he is held by those pupils who have pursued their studies under his superintendence." The testimonial has the names of seventy-two pupils attached to it, and is to the following effect:—"We, the undersigned present and former pupils of the Pharmaceutical Society, being desirous of testifying our appreciation of your indefatigable exertions and unremitting zeal in furthering the objects of the Society, and promoting the success and prosperity of its School, hereby request your acceptance of the accompanying testimonial, which we feel great pleasure in presenting with our most cordial wishes for your welfare and happiness."

So quietly was this testimonal got up, that Mr. Redwood had not the slighest knowledge of it until the presentation took place.

Mr. J. B. French, one of the first of the Laboratory Pupils of the Institution, was chairman of the meeting on the occasion.

NINTH ANNIVERSARY

OF

THE PHARMACEUTICAL SOCIETY,

Held at 17, *Bloomsbury Square*, *Tuesday*, *May* 21*st*, 1850.

Mr. Peter Squire, President, in the Chair.

The President, on opening the Meeting, said, he believed that the progress made by the Society since the previous Anniversary Meeting had been satisfactory. In the educational department of the Institution, the Lectures had been better attended than they were in the previous year, the Laboratory was in full and active operation, and the Candidates who presented themselves for examination before the Board of Examiners were increasing in numbers and in proficiency.

A new feature had been given to the Evening Meetings, which were intended for the Members and Associates and their friends, by the delivery of short courses of Lectures on subjects of general interest, which the Professors had voluntarily undertaken, and which had proved interesting and attractive.

"The readiness," said the President, "with which our Members have responded to the queries issued by the Committee appointed to investigate the subject of the Sale of Poisons, and the great amount of information thus obtained, which enabled the Committee to form a correct opinion upon the subject, has encouraged me to express an idea

which has occurred to me with reference to the formation of a National Pharmacopœia.

"Without disturbing the present constituted authorities, I have thought that we might advantageously apply the machinery which has been found to work so well in the inquiry relating to poisons, adopting a series of questions for eliciting information from the Members of our body as to the extent to which the rarely used *Materia Medica*, and other articles of the Pharmacopœia, are really employed, or what remedies, not contained in the Pharmacopœia, are, in different localities, used in place of them.

"Much useful information might also be obtained through this channel with reference to improved processes, not yet published, for the preparation of chemical and pharmaceutical compounds.

"We should thus collect the result of the experience of our Members since the publication of the last Pharmacopœia, as to the defects or advantages of the processes therein ordered.

"Whilst preparing a paper on the Formation of a National Pharmacopœia, five years ago, I had reason to believe, from letters received from Dr. Christison and Mr. Donovan, that the Colleges of Edinburgh and Dublin would be quite willing to join the London College, and to unite the three Pharmacopœias into one. Whatever we can do towards forwarding so desirable an object should be done without delay, and it has been under this impression that I have brought the subject under your notice.

"We should, of course, always require a reference to obsolete remedies in other books, but the serious differences in compounds bearing the same name in the different British Pharmacopœias, would be abolished.

"This subject reminds me of the loss the Society has sustained in my much-lamented and amiable friend the late Dr. Anthony Todd Thomson, whose biography in the pages of the *Pharmaceutical Journal* must have been read with interest, especially by the students of the institution. The Society, however, may be considered fortunate in having as his successor Mr. Bentley, who takes great pains in the instruction of his pupils; and the privilege of admission to the Botanic Gardens being retained, the students have all the advantages they previously enjoyed.

"More recently we have had to regret the retirement from office of our much-esteemed Treasurer, Mr. Pigeon, whose declining health and strength have obliged him to relinquish the active occupations in which he has been so long and so usefully engaged.

"I must not omit to notice the very gratifying indication afforded of the good feeling existing between the Laboratory Pupils and their Professor, by the testimonial and handsome service of plate which have just been presented in so modest and yet so appropriate a manner to Mr. Redwood.

"I have now but one other subject to refer to, and this is one which we shall have to submit to you for your decision. The Board of Examiners have, I believe, performed their duties to the satisfaction of the Society, and hitherto they have acted without remuneration. The number of Candidates for examination, however, has greatly increased, so as to render the duties arduous, frequently occupying five or six hours on the days of examination. The Council, therefore,

propose to pay four guineas to be divided between those of the Examiners who attend at the appointed hour at each time of their meeting."

The President now called on the Secretary to read the

REPORT.

The Council trust that the Ninth Annual Report, which it is now their duty to present, will be received by the Members as an indication of the gradual progress of the Society towards the accomplishment of the objects for which it was founded. The financial statement shews an apparent diminution in the income, when compared with the statement of last year. This arises chiefly from the proceeds of the Benevolent Fund Dinner, which augmented the amount in the year 1848. The remaining deficiency is occasioned by arrears of Subscriptions due to the Society.

RECEIPTS AND EXPENDITURE,

FROM JANUARY 1st to DECEMBER 31st, 1849.

Dr.

	£	s.	d.
Balance in Treasurer's Hands	46	8	6
Life Members' Fund Interest ..	20	18	0
Benevolent Fund Interest 100 8 6			
Subscriptons 94 16 0			
	195	4	6
Druggists' Old Fund, Interest	32	16	6
Government Securities, Interest.....	94	13	2
311 Town Members' Subscriptions	489	16	6
1176 Country Members	1234	16	0
Entrance Fees	21	0	0
546 Associates	286	13	0
308 Apprentices.....	161	14	0
Registration Fees	16	12	6
Arrears of Subscriptions	54	12	0
Lecture Fees	84	10	6
Laboratory Balance.....	38	9	11
Sale of Journals	9	18	10
	£2788	3	11

Cr.

	£	s.	d.
Benevolent Fund Gratuities..	30	0	0
Furniture	22	8	6
Museum	21	11	11
Postage	31	0	1
Delivery of Journals	151	14	0
Stationery	16	0	6
Advertisements.....	11	13	0
Salaries	305	0	0
Wages	134	0	0
Journals	675	0	0
Printing	35	10	6
Commission	44	6	9
House Expenses	34	6	5
Sundries.....	1	17	8
Lectures	485	3	0
Laboratory.....	145	18	4
Library.....	25	12	0
Fixtures and Fittings.....	25	11	6
Travelling Expenses of Country Members of Council	38	11	2
Rent, Rates, and Taxes.....	405	0	1
Balance in Treasurer's hands	147	18	6
	£2788	3	11

We, the undersigned Auditors, have examined the Accounts of the Pharmaceutical Society, and find them correct, agreeably with the foregoing Statement; and that there was standing in the names of the Trustees of the Society at the Bank of England, on the 31st of December, 1849,

		£	s.	d.
On Account of the General Fund	.....3¼ per Cent. Reduced	3000	0	0
Benevolent Fund	.....3 per Cent. Consols...	3447	11	8
Druggists' Old Fund, New 3¼ per Cents....		1036	7	1
Life Members' Fund, 3 per Cent. Consols		717	19	9

And we find that the following sums were due to the above-mentioned Stock :—

Life Members' Fund	83	16	0
Benevolent "	352	19	11
Druggists' Old "	82	1	3

THOMAS HAWKSBY.
JOHN WYMAN.

THE SCHOOL OF PHARMACY.

There has been an improvement in the attendance of lectures during the present season, as compared with the preceding year, and although the augmentation in the number of students has not been very great, yet it is satisfactory to find that there is evidence of an increasing demand for instruction among those who are entering upon the practice of Pharmacy.

There has also been a progressive improvement in the attendance of pupils in the Laboratory of the Institution, as indicated by the following statement of the numbers who have entered, and the fees paid, during the five years ending in 1849 :—

	1844-5.	1845-6.	1846-7.	1847-8.	1848-9.
Number of Pupils	10	27	27	27	31
	£ s.	£ s.	£ s.	£ s.	£ s,
Amount of Fees...	327 12	403 4	445 4	470 4	502 19

These results the Council are disposed to ascribe to the operation of those provisions in the Charter, by which scientific education is made the basis of qualification for admission into the Society. There is now a large number of registered Apprentices, who, in entering upon their pupilage, have recognised this principle ; and these young men, as the period of their apprenticeship expires, require systematic instruction in the several branches of science, with reference to which the proficiency of their knowledge is subsequently tested by examination. It has been the endeavour of the Council, from the first establishment of the Society, to maintain an efficient system of education, so that those among the rising generation who are actuated by the laudable ambition to be classed among the educated and qualified Pharmaceutical Chemists of the country, may be enabled to attain the object of their desire, through the instrumentality of this Society. We thus add to our strength, not only by the infusion of new blood into the body, but especially by the admission of those into membership who are distinguished by their devotion to the scientific cultivation of Pharmacy.

THE LIBRARY AND MUSEUM.

The outlay in the purchase of books during the past year has been small. A few donations have been received, and these, with the usual accumulation of periodicals, have more than filled the remaining space in the bookcases. Further accommodation will therefore be necessary in order to extend the Library, an object which the Council consider highly desirable.

An arrangement is in progress for adding to the Museum a portion of the collection of Dr. Pereira, lately removed from the London Hospital, comprising many curious and unique specimens.

PROVINCIAL SCHOOLS OF PHARMACY.

The impetus given to Pharmaceutical Education by the establishment of the School of Pharmacy in London, has given rise to similar proceedings in some of the large provincial towns.

During the past year a school has been founded at Liverpool, which

is conducted with much spirit; and the Council trust that it will prove essentially useful to the young men for whose benefit it is intended.

A similar undertaking has been commenced at Bristol, and although the reports have hitherto denoted less energy among the Associates than its promoters had reason to anticipate, yet the Council hope that the object will ultimately be carried out with success. An Association for the same purpose has been established at Birmingham with a satisfactory result.

These associations are not constituted officially as branches of the Society, but being undertaken with the same objects, and conducted on similar principles, the Council have thought it right to allude to them as indications of the progress of Pharmacy in the provinces.

THE EXHIBITION OF WORKS OF INDUSTRY OF ALL NATIONS.

Under the patronage of H.R.H. Prince Albert.

As this undertaking is intended to comprise manufactured products in general, among which a prominent place has been assigned to Chemical and Pharmaceutical Preparations, the Council could not pass over the subject without some notice. The auspices under which the project is brought forward, constitute an additional claim to the co-operation of all classes likely to be benefited by this unprecedented stimulus to industry and commercial enterprise.

Other societies having contributed towards the fund for defraying the preliminary expenses of the building, the Council think the Pharmaceutical Society ought not to withhold its share of support; and, therefore, suggest to the Members the propriety of subscribing the sum of twenty guineas towards this object.

THE SALE OF POISONS.

This subject has given rise to much discussion during the past year, on account of the numerous cases of accidental and criminal poisoning which have occurred. Reference was made to the Pharmaceutical Society by a committee of the Provincial Medical and Surgical Association appointed to consider the best means of obtaining a legislative enactment for restricting the sale of poisons. The Council, considering this a question directly affecting the interests of the Members, and one in which the experience of the Pharmaceutical Chemist might be of much practical service, appointed a Committee to investigate the facts, and confer with the committee above-mentioned.

For this purpose it was thought desirable to communicate by circular with all the members of the society, requesting information on the several points at issue, bearing upon the general question. The result of this correspondence was, a conviction that some of the proposed restrictions which had been submitted to the society for consideration, were either impracticable or calculated to interfere with the regular and legitimate business of the Chemist and Druggist, while others appeared free from objection, and likely, in some degree, to check the existing evil. After conference with the Committee of the Provincial Medical and Surgical Association, a modification of the propositions was mutually agreed upon, and the following were adopted as the basis of the recommendation to be submitted to the consideration of the legislature:—

1st. That the sale of arsenic by retail should be restricted to Apothecaries and Chemists and Druggists. 2nd. Arsenic should only be sold to male adults known to the vendor, or to their written order. 3rd. The vendor should enter the sale in a book, with the date, and the object for which it was required, to which the applicant and a witness, one or the other known to the vendor, should sign their names, unless a written order is brought, in a handwriting known to the vendor, which order should be pasted in the book.

These recommendations were embodied in a memorial from the Provincial Medical and Surgical Association to the Secretary of State, praying that a legislative enactment might speedily be passed, placing the sale of poisons under suitable restrictions. The Council of the Pharmaceutical Society also presented a memorial on the same subject, in which attention was especially drawn to the fact, that no legislative enactment, in regard to the sale of poisons, could be complete and effectual, unless accompanied with a provision for regulating the qualifications of Pharmaceutical Chemists.

The Secretary of State has subsequently given notice that he is preparing a bill for the restriction of the sale of poisons, which will shortly be introduced by the Government.

On receiving this intelligence, the Council re-appointed the Poison Committee, with instructions to watch the progress of the bill—a precaution which was considered necessary, on the introduction of a measure of so much importance to the trade.

PHARMACEUTICAL LEGISLATION.

The Council regret that their endeavours to obtain the introduction of a Pharmaceutical Bill have not yet been attended with the desired result. This has arisen from circumstances not under their control; and while they are disappointed at the delay that has taken place, they have reason to believe that the subject cannot fail to claim the serious attention of the legislature at an early period. The deputation, who were favoured with an interview with the Lord Advocate last year, were encouraged to hope that the differences then existing in the medical profession were in process of arrangement, and that the Medical Bill which was anticipated in a few days from that time would have met with a favourable reception. Had this been the case, the subject of Pharmacy, the importance of which was fully recognised, would have obtained the early attention of the Committee of the House of Commons. Unexpected obstacles prevented the completion of the Medical Bill, and the entire question was of necessity postponed.

The question has now been resumed, and the Council have been informed that considerable progress has been made towards a satisfactory adjustment of the details. The recent discussions on the sale of poisons will afford an additional stimulus to pharmaceutical legislation, as the passing of a Bill restricting to Chemists and Druggists the sale of any class of substances will render absolutely necessary a provision respecting the qualifications of those who assume that title. Without this provision, such a Bill would be inoperative.

It was moved by Mr. W. A. Baiss, and seconded by Mr. John Atkins,

"That the Report now read be adopted, and be printed in the Transactions of the Society."

Before putting the motion, the President inquired whether any Member had any remarks to make with reference to the subjects alluded to in the Report, as this would be the proper time to make them.

Mr. Humpage would not allow the opportunity to pass without making a few observations, lest it should be thought that the interest felt in the affairs of the Society had diminished, whereas he believed that the fact was otherwise as regarded both Members and Associates. It was true that, on comparing the financial statement of last year with that just read, there appeared to be a slight falling off in the numbers; and this he believed arose principally from the circumstance that some of the Members and Associates in remote districts took too superficial a view of the objects the Society is destined to fulfil. He found most of those with whom he associated, fully sensible of the importance of the benefits already obtained, as well as of those still in prospect. It was not many months since it was gravely asserted that the Chemist and Druggist was not qualified to dispense medicines; and, were it not for the efforts made by our body to improve their qualification, there would be constant attempts to get the dispensing into the hands of the Apothecaries. He considered that every Druggist ought to be capable of examining and testing the articles that come into his stock; and yet, until the establishment of the Pharmaceutical Society, how very few ever thought of acquiring this knowledge! As he had alluded to the financial statement, he might remark that there was one item contained in it which appeared to him to be rather high. He alluded to the amount incurred for the transmission of the Journals. He had no doubt the subject had engaged the attention of the Council, but it had occurred to him that probably increased punctuality and greater economy might be effected by sending the Journals through the post.

Mr. C. Edwards, in reference to the proposition of the Council, that the sum of twenty guineas be subscribed by the Society to the Exhibition of 1851, wished to inquire, whether any one present had ascertained upon what terms the public were to be admitted to the Exhibition. He believed that so far from subscriptions being required for that great national undertaking, the fees for admission would more than cover all expenses. Besides, he very much doubted whether, under any circumstances, they ought to apply the funds which had been subscribed for other and specific purposes to such an object. He thought the Country Members would object to it. Surely, the Benevolent Fund of the Society had a prior claim for any sum that could be spared from their income.

Mr. Philpot thought with the previous speaker that it would be wrong to apply, for the purpose proposed, any sum from the funds of the Society that might otherwise be added to the Benevolent Fund. He would suggest that the Members be invited to subscribe to a fund which should be handed over for the purposes of the Exhibition, as the subscription of the Members of the Pharmaceutical Society. Having moved an amendment to this effect,

Mr. Shaw, of Liverpool, seconded it. He thought the payment of the proposed sum from the funds of the Society would be a misappropriation of the funds.

Mr. Jacob Bell said he had been communicated with by some Country Members, who objected to the payment of the proposed subscription out of the funds of the Society. He was requested to state on behalf of these Members that many of them had already subscribed in the country, and they thought it would be unfair to make them pay a second time through the funds of the Society. They recommended a separate voluntary subscription, as proposed by Mr. Philpot.

Mr. Ince thought the circumstance urged by Mr. Bell on behalf of Country Members did not place them in a more unfavourable position than the London Members, many of whom had subscribed individually. He hoped that, in addition to such subscriptions, the Society would subscribe as a corporate body. Most other corporate societies had done so.

Mr. Waugh advocated the propriety of confirming the recommendation of the Council. The question was, shall the Society, as such, contribute in common with other societies towards carrying out a great national object, which was calculated to benefit science? He felt assured that the Members generally would not object to such an application of the sum proposed to be given. He had heard with much regret the remark, that it would be a misappropriation of the funds of the Society.

Mr. Thomas Herring contended that the exhibition was calculated to do much good to all classes, and he did not think that the Benevolent Fund would suffer, as some Members seemed to anticipate, from the application of the small sum named by the Council to such an object. He agreed with Mr. Edwards in thinking that the admission fees would more than meet the expenses of the exhibition, in which case there would be a surplus to be refunded or applied to various benevolent purposes.

Mr. Bartlett thought it would not be creditable to the Society to refuse contributing the sum named for so excellent an object as that contemplated by Prince Albert, the originator of the exhibition. It was designed to promote the cultivation of peace and good-will among nations, and to encourage the honest industry of all classes. He should be very sorry to see the Pharmaceutical Society indicate indifference to such noble objects.

Several Members having expressed a doubt, whether it would be in accordance with the conditions on which the Charter had been granted to the Society, to devote any of the funds to an object not recognized therein, to the exclusion of the Benevolent Fund, which was one of the principal objects contemplated,

Mr. Bell observed that it was a mistake to suppose that the existence of the Benevolent Fund had facilitated their getting the Charter, as the reverse was the fact, the Benevolent Fund having been rather an obstacle than otherwise; and the ground upon which the Charter was ultimately obtained having been the provisions made by the Society for promoting the improvement of the art and science of Pharmacy; and he considered that by supporting the exhibition of 1851, they would be contributing in no small degree to that object.

A Member from Brighton said he thought the Country Members were not so much opposed to this proposition as had been represented. For his own part, he approved of it.

Mr. T. M. Clarke, of Richmond, agreed with the previous speaker.

As a Country Member he thought the proposed subscription from the Society afforded to those who had not subscribed individually, an easy and agreeable means of testifying their approval of this great national undertaking in a collective capacity.

Mr. Bird spoke in favour of the proposition, and the Mover of the amendment having withdrawn it, the original motion was put and carried.

It was then moved by Mr. Thomas Herring, seconded by Mr. John Coles, and *resolved*—

"That the sum of four guineas be appropriated to the Board of Examiners on each occasion of their sitting."

Mr. Jacob Bell moved the next resolution, which was—

"That the Thanks of this Society be presented to Mr. Richard Hotham Pigeon, for his valuable services as Treasurer to the Society during the period of ten years; and that a copy of this Resolution be transmitted to him with the expression of the sincere regret of the Society that the state of his health has obliged him to retire from office."

Mr. Bell observed, that Mr. Pigeon had been one of the most steady and zealous supporters of the Society from its formation until the present time. When the Society was started he gave the use of his house for holding the meetings; and in a variety of ways he had rendered essential service to them. He, Mr. Bell, felt assured that the Members of the Society all participated in the regret which he felt that the state of Mr. Pigeon's health rendered him no longer capable of officiating as their Treasurer.

Mr. T. N. R. Morson seconded the resolution, which was carried with acclamation.

The vote was responded to by Mr. R. H. Pigeon, jun., on behalf of his father.

The President stated that the next business would consist in the election of Council and Auditors for the ensuing year.

Messrs. Baiss, Edwards, Philpott, and Shaw, were appointed Scrutineers, and having reported the result of the election, the Chairman declared the following to be duly elected:

COUNCIL.

Bell, Jacob, 338, Oxford Street
Bird, William L., 42, Castle Street, Oxford Market
Davenport, John T., 33, Great Russell Street
Edwards, George, Spital Street, *Dartford*
Evans, Edward, 52, Hanover Street, *Liverpool*
Garle, John, 12, Kensington Terrace, Gravel Pits
Gifford, Joseph, 104, Strand
Hanbury, Daniel B., Plough Court
Herring, Thomas, 40, Aldersgate Street
Hooper, William, 24, Great Russell Street, Covent Garden
Ince, William, 3, Southampton Street, Strand
Lea, John W., 68, Broad Street, *Worcester*
Lescher, Joseph S., 60, Bartholomew Close
Morson, Thomas, N. R., 19, Southampton Row
Pedler, George S., 199, Fleet St.
Pigeon, Richard H., Jun., 31, Throgmorton Street
Sandford, George W., 47, Piccadilly
Southall, William, *Birmingham*
Squire, Peter, 277, Oxford Street
Watts, John, Edgware Road
Waugh, George, 177, Regent Street

AUDITORS.

BOURDAS, ISAIAH, 10, Pont Street, Belgrave Square
BUCKLEE, WILLIAM HENRY, 86, New Bond Street
COCKSEDGE, HENRY B., 502, Oxford Street
DAVY, CHARLES, 100, Upper Thames Street
HOWSE, WILLIAM, 16, Tichborne Street

It was then moved by Mr. R. H. PIGEON, jun., seconded by Mr. RALPH STAMPER, and *resolved*—

"That the Thanks of the Society be given to the Council for their services during the past year."

Mr. THOMAS HERRING acknowledged the vote on behalf of the Council.

A vote of Thanks was passed to Mr. Peter Squire for his services as Chairman, which he acknowledged.

Mr. T. DAVENPORT said he might, perhaps, be allowed, before the Meeting separated, to propose one other resolution; it was—

"That the Thanks of the Meeting be given to Mr. Jacob Bell, for his zeal and ability in promoting the welfare of the Pharmaceutical Society, and editing the *Pharmaceutical Journal*.

This was seconded by Mr. HUMPAGE, and carried.

Mr. BELL acknowledged the vote.

At the conclusion of the Meeting, several Members commenced a subscription to be added to the sum voted by the Society to be given to the Exhibition of 1851.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Colquitt Street, Friday Evening, May 17th, 1850.

THE PRESIDENT IN THE CHAIR.

DR. BRETT delivered a Lecture on "The Impurities and Adulterations of Chemical Preparations." Acetic acid, he observed, contained frequently sulphurous acid, lead, copper, &c. The best way of purifying it from SO_2 is to mix it with binoxide of lead, and redistil, sulphate of lead being formed, the acid passes over pure.

The specific gravity of this acid was no test of its strength, samples of the acid of sp. gr. 1068, having been found to contain from 63 to 97 per cent. of glacial acid.

Citric, tartaric, sulphuric, hydrochloric, phosphoric, and hydrocyanic acids, were next noticed, and in the latter, the importance of uniform strength pointed out.

Trisnitrate of bismuth varies very much in the percentage of nitric acid, upon which its activity depends. This has been pointed out to the Society by Mr. Edwards, who has recently made and published some analyses on this salt (*Pharm. Journ.*, vol. ix., page 461).

Calamine was found to contain from 78 to 88 per cent. sulphate of baryta, with traces of lime, lead, and zinc. Tartar emetic frequently contains bitartrate of potash and iron. White precipitate is frequently much adulterated with sulphate and carbonate of lime, carbonate of lead, and sulphate of baryta. Iodine contains sulphur and a variable quantity of water.

Iodide of potassium frequently contains from 5 to 10 per cent. of other salts, as iodate of potash, carbonate potash, and chloride potassium. Dr. Brett noticed several other salts which were more or less subject to

contamination or adulteration, and gave modes of detecting and separating these impurities.

Dr. Dickinson then read a very interesting paper on "The importance of Botany, in its relations to Pharmacy." After explaining the terms Botany and Pharmacy, and showing that they include a considerable proportion of the substances in the providing and dispensing of which the pharmaceutist was professionally engaged, Dr. D. demonstrated the indispensable necessity of botany as a branch of the scientific pharmaceutist's education. He then pointed out the impossibility of obtaining accurate information respecting some of the most valuable remedies of the ancient physicians, on account of their ignorance of botanical science and terms; and observed that, without this knowledge, the discoveries of modern times would be liable to the same inconvenience. Herbalists, from the same cause, are constantly falling into the most serious errors in collecting plants, and the pharmaceutical Chemist in preparing them, especially in extracts, &c.

Dr. D. explained the causes of the discordant statements of medical men regarding such powerful and valuable agents as Ext. Conii, Ext. Hyoscyam., Ext. Belladonnæ, Tinct. Digitalis, &c., pointing out their frequent adulterations, &c. He then directed the attention of the Society to the influence which soil, humidity, climate, and cultivation, had in modifying the properties of plants, and to the importance of being fully acquainted with the proper time for collecting them, in order to obtain the plant in perfection for medicinal purposes. Numerous examples were adduced on each of these points. Dr. D. concluded by expressing his conviction that a scientific and practical knowledge of botany was, if possible, even of more importance to the pharmaceutist than to the medical practitioner—at least, in large towns—as the medical prescriber had, for the most part, merely to do with the physiological effects and practical uses of plants; whereas, the pharmaceutist was under the necessity of being also fully acquainted with their physical properties and external characters, in order to prepare and dispense accurately the prescribed remedies.

Mr. H. S. Evans read a paper on "Isomorphism," in which he gave the leading features of this interesting doctrine, and instanced many examples. He pointed out the importance of its application in ascertaining the atomic weights of substances—otherwise uncertain—and the curious relation existing in many instances between the specific gravity and atomic weight of the various members of isomorphous groups; and, in conclusion, he reverted to the objections that had been raised to the theory, and enumerated the leading exceptions to these laws.

The Secretary stated that the Council having had their attention directed to a recent discrepancy in an analysis of Bootle water, had deemed it advisable to ascertain with certainty the disputed point, and a deputation of the Council had therefore visited Bootle, and forwarded several samples of water to eminent analysts in London. The results given by these Chemists are as follows:—

The whole of the chlorine in the water estimated as Na Cl gave 3.33; 3.36; and 3.50 grains of that salt per imperial gallon. The very large amount of chlorides, given in a recent analysis, viz., $\left\{\begin{matrix} 3.45 \text{ Na. Cl.} \\ 9.07 \text{ Mg. Cl.} \end{matrix}\right\}$ must therefore be exceedingly incorrect.

The First Anniversary Meeting of the Society will be held on Monday, June 10.

SOME REMARKS ON THE BOOTLE WATER.

BY DR. SHERIDAN MUSPRATT, F.R.S.E.

A bottle of water, left at my house on the evening of the 13th of March, and labelled "Bootle," was submitted to analysis. It gave 12.4 grains of chlorides per gallon. Two Chemists in London found 9.92 grains of chlorides *in the same water;* and my friend, Dr. Playfair, analysed some time ago a sample of water sent to him from Liverpool, and labelled "Bootle," which yielded 13.1 of chlorides. I will append the determinations *of the principal ingredients* in Dr. Playfair's* and my analysis, to prove that we *must have operated upon similar samples* :—

	PLAYFAIR, 1849.	MUSPRATT, 1850.
Carbonate of lime	8.30	8.01
Chlorides	13.10.....	12.52

Dr. Playfair has stated the above sample of water could not be Bootle(?) as it differs so much from an analysis of water which he made in 1847. In that year the Bootle water gave him 5.36 of chloride of sodium. The Chemists' Association of this town lately forwarded another sample of water to Dr. Playfair, marked "Bootle." He *now only finds* 3.3 *of chloride of sodium* per gallon !

The only inference which can be drawn from the preceding is, that the Bootle water is most changeable, especially as to chlorides. In my opinion, the chloride of sodium should not diminish in quantity—in fact, I do not see how it possibly could ; therefore, Dr. Playfair might not have analysed the Bootle water even in 1847?

Having some of the water remaining that was *sent* to me and labelled "Bootle," I repeated the determination of chlorine in the presence of Mr. Joseph Danson, my senior pupil. *The result exactly corresponded with my first one.*

First determination	8.7 chlorine
Second ditto	8.6 ditto

If the Bootle water only contains three to four grains of chlorides (?) some error must have taken place *unconnected* with my analysis.

There has been a great deal of misunderstanding and confusion with regard to the Bootle water‡, or else the following amounts of residue per imperial gallon could not have been obtained by different Chemists from *the same spring.*

Bootle Water : Amount of Residue per Imperial Gallon in grains.

† Dr. Thompson	19.40	
Mr. Phillips	24.00	
Dr. Brett	10.62	
Dr. Playfair	20.16	25.081
Dr. Muspratt	28.29	

In conclusion, I will state that, although my result *was against* the gentlemen who favoured me with the analysis, nevertheless their chairman wrote me the following polite note:—

"I am satisfied all who really desire the great question of water supply to be settled on its own merits, must regret the controversy. For your own satisfaction, I may state, every Member of the Parochial Water Committee is satisfied with your analysis."

College of Chemistry, Liverpool, May 22.

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* See the Liverpool Town Clerk's Report. † From Mr. Stephenson's Report.

‡ It is strange the Bootle water is the only one that has given such varying results. The analysis of the Bevington Bush, Copperas Hill, Green Lane, Park and Soho waters, by *different* Chemists, *agree very closely.*—See *Mr. Stephenson's Report.*

ORIGINAL AND EXTRACTED ARTICLES.

London, 20*th May*, 1850.

ON THE ADULTERATION OF ISINGLASS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The last number of the *Pharmaceutical Journal* contains a communication from Mr. Redwood, with the above title. In this paper an attempt is made to prove that Messrs. Dawson and Morris have supplied Messrs. Banks and Eland with what Mr. Warington terms "a very inferior article," and Mr. Redwood describes as an adulterated one, consisting of "a mixture of isinglass and gelatine."

Messrs. Dawson and Morris feeling the injustice of the charge thus brought against them, and of the injurious effect which it must have on their character, have requested us to investigate the case; this we have done, and send you the results of our examination for insertion in the *Pharmaceutical Journal*, trusting to your sense of justice for complying with our request.

We are, Sir, your obedient Servants,

Richard Phillips,
John Thos. Cooper.

The first statement which we shall make is, that the isinglass which Messrs. Dawson and Morris sell is imported direct from Russia by Messrs. Cox, Heisch, and Co., of America Square, as will appear by a letter of which the annexed is a copy:—

[*Copy.*] 16, *America Square*, *May* 10, 1850.

R. Phillips, Esq.

Dear Sir,—Herewith you will receive two average samples of ten casks Belouga isinglass, imported by us direct from St. Petersburg, from one of the most respectable houses there, for Messrs. Dawson and Morris, in the ship *Camilla*, and now lying in bond at Bell's warehouse, Fresh Wharf, being part of a parcel of nineteen casks isinglass received here in October last. This isinglass is received from Russia in proportions of four-fifths firsts, and one-fifth seconds. The sample No. 1 is firsts, of which there are eight casks; and the sample No. 2 seconds, of which there are two casks.

We shall feel obliged by your analysing these and reporting thereon.

We are, dear Sir, yours faithfully,

Two samples. Cox, Heisch, & Co.

Of these samples we examined minutely, only the firsts, and our examination showed that a portion, washed with warm water, yielded a solution which was acid to litmus paper, was found to contain sulphuric acid in excess and lime. One hundred grains, burnt in a platina capsule, left gr. 0.86 of light reddish coloured ash, which consisted of sulphate of lime, peroxide of iron, and sand, with indications of a trace of alumina. It contained no carbonate of lime.

A sample of cut isinglass, sold by Dawson and Morris to Banks and Eland, was furnished by the latter, sealed with their seal, on which their names are engraved. This we received as a sample of the same isinglass as that which Dawson and Morris had originally from Cox, Heisch, and Co., and had sold, after cutting, to Banks and Eland.

A solution of this was acid to litmus paper; and 100 grains left by burning 0.72 grs. of ash, which exactly resembled, in appearance, that

obtained from Cox, Heisch, and Co.'s sample, being of a light reddish colour, and the quantity was as nearly the same as 0.72 to 0.86, and it consisted of the same substances, viz. sulphate of lime, peroxide of iron, sand, and indications of a trace of alumina. It contained no carbonate of lime.

The sample which we next examined was received from Mr. H. Stokes, with a letter, the following of which is a copy :—

[*Copy.*] 175, *Strand, May* 8, 1850.

Messrs. Cox, Heisch, & Co.

Gentlemen,—Messrs. Dawson and Co. have requested me to send to you sample of isinglass for the purpose of having it analysed, to test whether the charges made by Mr. Vickers are correct or not, that it contains gelatine.

The sample I sent you is from a parcel of isinglass I received from Messrs. Dawson and Co. on the 15th of last February. I shall be glad to hear the results of your experiments.

I am, Gentlemen,
Your obedient Servant,
Harry Stokes.

With this sample experiments were made with the annexed results : it was acid to litmus paper when moistened. One hundred grains left by burning 0.70 gr. of ash, of a light reddish colour, perfectly resembling in appearance the residue of the preceding samples. It consisted of sulphate of lime, peroxide of iron, a little sand, with indications of traces of alumina. It contained no carbonate of lime.

For sake of comparative results with isinglass and gelatine, we burnt 100 grains of Swinburne's gelatine; the residue weighed 0.52 gr., and unlike all the residues hitherto described by us, it was perfectly white. When moistened it was strongly alkaline, and the aqueous solution gave a white precipitate of carbonate of lime, on the addition of carbonate of ammonia ; when saturated with hydrochloric acid, it gave a white precipitate with chloride of barium, indicating sulphate of lime ; it contained also a small quantity of carbonate of lime.

This gelatine, unlike all the samples of isinglass which we examined, was not acid to litmus paper. The sulphate and carbonate of lime were probably derived from the large quantity of water used in preparing it.

The gelatine was almost entirely soluble in water, and did not exhibit any flocculent insoluble matter peculiar to isinglass, and which was yielded by all the other samples above reported, and the quantities appeared to be nearly equal.

From the experiments which we have now detailed, we feel justified in concluding that the isinglass supplied by Messrs. Cox, Heisch, and Co. to Messrs. Dawson and Morris is perfectly genuine ; and that the sample produced by Messrs. Banks and Eland of the article sold to them by Messrs. Dawson and Morris is also genuine, as well as that received from Mr. Stokes,

It will be observed that the discrepancies between the results obtained by us and by Mr. Redwood are very considerable. From gelatine he obtained 3. (misprinted .3) per cent. of ash, consisting principally of carbonate of lime ; in our experiments the ash amounted to only 0.52 gr. per cent., and it consisted of lime, its sulphate, and only traces of carbonate. In Mr. Redwood's experiment 100 grains

of isinglass yielded only 0.5 gr. of residue, chiefly carbonate of lime; we obtained 0.86 gr. per cent. of residue, which contained no carbonate of line whatever.

Mr. Redwood also tried "a specimen of isinglass procured from the same source as that referred to in Mr. Warington's report, and suspected to be adulterated." This, of course, alludes to the article sold by Messrs. Dawson and Morris to Messrs. Banks and Eland. Here discrepancies increase. We found 0.72 per cent. of ash, Mr. Redwood obtained 1.5 per cent., chiefly carbonate of lime; we could not find a particle of it.

Under these circumstances we repeat the statement already made, that in our opinion the sample of isinglass which we examined as a portion of that sold by Messrs. Dawson and Morris to Messrs. Banks and Eland, is perfectly genuine and unadulterated; and we can account for the different conclusion at which Mr. Redwood has arrived only by his not having analysed a sample of the same article as that which we received under the seal of Messrs. Banks and Eland.

[The fallacy of this report is obvious. Mr. Phillips states, that the genuine isinglass which he examined was acid to test paper and contained free sulphuric acid and sulphate, but no carbonate of lime. It may, therefore, be inferred that this isinglass had been bleached by sulphurous acid, a process usually adopted with isinglass, which, although genuine, is not of the first quality. Mr. Redwood took as his standard, a specimen of isinglass of the first quality, which contained no free sulphuric acid, and which yielded an ash containing carbonate of lime. The presence of free sulphuric acid in Mr. Phillips's specimen would account for the absence of carbonate of lime, and for an increase in the weight of the ash. The sand found by Mr. Phillips would further account for the increased weight of the ash, and denotes the inferiority of the sample examined.

The results obtained by Messrs. Phillips and Cooper on incinerating gelatine, seem to indicate that the mode of detecting the adulteration by the *quantity* of ash, as recommended by Mr. Redwood, cannot be relied upon when the adulteration is effected with Swinburne's gelatine. This part of the subject, however, requires further investigation; but it may be observed that while Messrs. Phillips and Cooper confined their examination of gelatine to a kind not suspected to have been used, Mr. Redwood's examination included that actually employed in the adulteration.

We observe an attempt at mystification in Mr. Phillips's statement of the composition of the ash obtained from gelatine. He says, "From gelatine he (Mr. R.) obtained 3. (misprinted .3) per cent. of ash, consisting principally of carbonate of lime; in our experiments the ash amounted to only .52 per cent., and it consisted of lime, its sulphate, and only traces of carbonate." These results would depend upon the way in which the calcination was effected. We presume Mr. Phillips does not mean to assert that the lime was obtained in the caustic state from the calcination of an organic body without its having been first in the state of carbonate. Of course that carbonate might be rendered caustic by calcination.

There is no evidence to prove that the isinglass, represented as adulterated, which Mr. Redwood examined, was identical with that

supplied to Messrs. Phillips and Cooper by the parties implicated, which further reduces the value of the counter-statement. Nor is it proved that the samples examined by Mr. Phillips were genuine, for if so, why did he omit to adduce the obviously appropriate evidence of the microscope, and the other means pointed out in Mr. Redwood's paper, instead of resting his opinion on a very superficial and insufficient examination?

We have seen the microscopic appearances of the samples examined by Mr. Redwood, with other confirmatory evidence, and have not the slightest doubt whatever as to the fact of the adulteration.

So much for the report of the two Chemists.

The method in which the fraud was detected is worthy of remark: A gelatine manufacturer, desirous of extending his trade, offered some gelatine of a particular description to an isinglass manufacturer for the purpose of mixing with his isinglass, stating, by way of recommendation, that he sold a large quantity annually to Messrs. Dawson and Morris for that purpose. The dealer in isinglass, desirous of obtaining further information on a subject so important to him in his business, waited on the gelatine manufacturer to make further inquiry, and was informed that the fact was notorious, that Mr. Morris had admitted it, alleging that "he was so cut down in the price of his isinglass that he could not afford to sell a genuine article." Mr. Morris had also shown him a jelly made from the adulterated isinglass, and remarked at the time that "he would defy any one to detect it." Moreover, Messrs. Dawson and Morris have purchased, within a year, about two tons of the kind of gelatine alluded to. Not being (according to their own statement) in the habit of selling this particular description of gelatine, it might be asked for what purpose do they require so large a quantity? The answer is obvious from the admission of Mr. Morris.]—Ed. *Pharm. Journal.*

OXYCHLORIDE OF CALCIUM.

(3 Ca O + Ca Cl + 14 Aq.)

BY MR. BEESLEY.

In the course of some experiments about three years since, I accidentally met with this substance, an account of which, as I have never met with it in chemical books, may perhaps not be unworthy of insertion in the *Pharmaceutical Journal* *. It was obtained, in the first instance, by acting upon an excess of hydrate of lime by hydrochloric acid—separating in crystals on the cooling of the filtered solution. I afterwards found that it could be readily prepared by boiling hydrate of lime in a moderately strong solution of chloride of calcium, filtering rapidly, and setting the filtrate to cool in a well-covered vessel. The crystals deposited, which are generally needle-shaped, but occasionally in small irregular prisms, must be quickly dried by pressure between folds of blotting-paper, and finally over sulphuric acid under a bell-glass. No attempt must be made to wash them, as they are decomposed both by water and alcohol.

These crystals, when exposed to the air, absorb water and carbonic acid, become opaque, and gradually deliquesce, being decomposed

* Since this notice was written I find it is described in Gmelin's *Chemistry*, and represented to contain 16 Aq.

into chloride of calcium and carbonate of lime. Water quickly decomposes them into chloride of calcium and hydrate of lime. Exposed to a red heat they lose about half their weight of water; but it is impossible to expel the whole of the water without the loss of some chlorine. At a stronger heat they fuse into an enamel.

The following is the mean of two corresponding analyses of these crystals, the water being determined by the loss:—

		Calculated as 3 Ca O + Ca Cl + 14 Aq.
Lime	30.94	31.64
Chloride of Calcium	20.80	20.89
Water	48.26	47.47
	100.00	100.00

In an experiment where the water was determined by the loss on strong ignition, allowance being made for the chlorine expelled, 47.76 per cent. was obtained; but the hygroscopic properties of the ignited substance present difficulties in determining the exact weight.

Making due allowance for an excess of chloride of calcium, which, from the mode of preparation, is necessarily present, and also for a slight excess of water which it is difficult or impossible to remove, the analysis will agree sufficiently well with the formula given above. The equivalent will be 3318.2 (O = 100), or 265.45 (H = 1).

High Street, Banbury.

ON THE MICROSCOPICAL ANALYSIS OF THE DUST OF THE REGULAR WINDS AND OF BLOOD-RAIN.

BY DR. C. G. EHRENBERG.

[In May, 1844, Ehrenberg communicated to the Academy of Sciences of Berlin, the first of a series of most important and interesting papers on the dust of the regular winds and on blood-rain. These papers were continued to the end of the year 1849, and have now been published collectively under the title of *Passat-Staub und Blut-Regen ein grosses organisches unsichtbares Wirken und Leben in der Atmosphäre.** The work consists of 192 folio pages, and contains seven tables and six coloured copper-plates. The objects and limits of our Journal prevent us from giving more than a synopsis of Ehrenberg's discoveries and conclusions. The terms and phrases are, in general, literal translations of those employed by the distinguished author.]

Summary of the Results and Propositions.

The more I have studied atmospheric dust the more I have felt that the subject is one of great and rapidly-increasing interest; that it is opposed to not a few prevailing and important opinions, and that it gives rise to and confirms new scientific ideas. It is only the beginning of future great knowledge. I hope that, in my attempt to draw conclusions from these observations, which I have laboriously collected with the greatest possible care and circumspection, I have neither dwelt too much on what is unimportant, nor omitted any points which can lead to further correct investigation.

1. The phenomena, which are here comprised under the names of *dust of the regular winds* [Passat-Staub], and which are the cause of the cinnamon-coloured dust-meteors, have hitherto been known by the names of

* *Dust of the Regular Winds and Blood-Rain, a great organic invisible effect and life in the Atmosphere.*

dust hurricanes, red-dust rain, red volcanic-ashes rain, blood rain, blood dew, bloody sweat of stones and statues, bloody water, bloody ears (of corn) *of the field, red fresh fallen snow, fall of congealed blood, flesh rain, mud rain, loam rain, fetid unhealthy rain, brick rain, ink-rain, meteor-stone clouds, meteor-stone dust and jelly, yellow and fiery red dense clouds, burning sky, the fog-coast of Western Africa and Atlantic dark sea, or sea of darkness*;† and have probably been the subject of many important considerations under the denomination of the *fog-mountains of Central Asia*, of *fire-rain*, of *red hail*, of *dry fog*, of *high-smoke*, of *red dry atmospheric vapour passing into sheep-clouds*, of *light-reflecting sheep-clouds*, of *haloes of the stars*, of *earth-sweeping comet-tails*, but certainly under those of *cosmical dust*, and of *small chaotic cometary cosmical clouds.* (Chladni, 1813.) Whether the strange high-smoke, which occurred in the year 1547, at the time of the battle near Mühlberg, and continued for three days, belongs here or not, can neither be demonstrated nor positively denied. Our knowledge of the phenomenon is already almost sufficient to enable us to admit it. The subject engaged the lively imagination of Kepler, and suggested to him the idea of the mutability of celestial matter, from whose periodic condensation immediately arise comets, which by solar heat acquire sidereal motion, and from which several of the above-mentioned names are derived.

2. The name *dust of the regular winds* (Passat-Staub) was first applied here (since 1847, *Monatsbericht*, p. 312) to the Atlantic dust-meteors. The combination of the Atlantic dust with the regular winds, not with the Harmattan, was declared to exist by Captain Tuckey in 1816, and it has been acknowledged since 1830 in consequence of the statements of Captain Wendt of the Prussian merchant service ; and has been placed beyond doubt by the reports of Burnett in 1837, and of Captain Hayward in 1839. Admiral Roussin, in 1817, also distinguished the constant coast-fog from the periodic Harmattan.

3. The historical synopsis, the particulars of which are referred to the best existing sources, shows that the phenomenon extends chiefly along the western coast of Central and North Africa, and thence taking a north-easterly direction, over Italy, towards Armenia, in the direction of the Mediterranean sea, continuing uninterruptedly in the first district, and being in the latter always periodic ; that it extends also sometimes over the whole of Europe, even to the northern part of it, and more rarely to Sweden and Russia ; but that in Asia it passes between the Caspian Sea and the Persian Gulf (Balkh, Kufah, Bagdad), reaching perhaps Turkistan, Beloochistan, Kaschgar, and China. In Kaschgar, in Central Asia, the same relation exists as in Western Africa, where the hot constantly-rising column of air over the broad continent, offers a permanent obstacle to the uninterrupted passage of the upper regular wind and current of dust from west to east, and perhaps also occasions its deviation towards the north. From both South and North America only isolated cases are mentioned ; and these may also be considered as deviations from the normal direction. It is very remarkable that the peculiar fog-coast from Cape Bojador to Cape Blanco is situated in the greatest west-eastern latitude and in the flattest part of Africa, whilst the district of Bolar Takh is the greatest warm flat district of the kind in Asia. Thus this phenomenon accompanies the Mediterranean with its continuations from Africa over Italy towards Asia, and turning from the tropics more and more to the north to Central Asia, as is shown in the special tables of the geographical extension.

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† The *Dunkelmeer* or *Meer der Finsternisse* (dark sea, or sea of darkness) of the Arabs, has been the subject of a notice by Ehrenberg, communicated to the Berlin Academy of Sciences on the 27th of Jan., 1848, and published in the proceedings of that learned body.—Ed. *Pharmaceutical Journal.*

4. The dust of the regular winds contains *silica, alumina, oxide of iron, oxide of manganese, carbonate of lime, magnesia, potash, soda, oxide of copper, water* and *organic* (combustible) *matters*. By microscopic analysis we discover in it fine quartz sand, and still finer yellowish or reddish mould [mulm] (very fine granular dust, *Gallionella ferruginea* ?) mixed with numerous organic forms and fragments. Generally single isolated fragments of pumice-stone are observed in it, but chiefly green prisms of crystal, as in volcanic tufa and ashes. Likewise white calcareous crystals which readily dissolve in muriatic acid. The organic substances are *Polygastrica, Phytolitharia, Polythalamia*, and soft vegetable parts. But *Zoolitharia Polycystina* and *Geolithia* (from Barbados) have never been discovered in it. The total number of forms amounts to 320 species. Silica, iron, carbonate of lime and carbon are sufficiently accounted for by the organic forms.

5. Fresh-water forms and land forms are by far the most predominant. The following genera are exclusively found in sea-water :

Coscinodiscus	*Grammatophora*
Diploneis	*Biddulphia*
Goniothecium	

Besides these, all *Polythalamia*, and some marine *Spongolitha, Sp. Clavus, cenocephala, Caput serpentis, obtusa, robusta.*

Known African forms have not been found. The great majority of forms are found in many parts of the globe, also in Europe and Africa. The following belong to America (see *das Kleinste Leben in America*, 1843):—

Arcella constricta	*Eunotia Quaternaria*	*Stauronies dilatata*	
Desmogonium Guyanense	*Quinaria*	*Surirella Peruana*	
Eunotia Camelus	*Gomphonema Vibrio*	*Synedra Entomon*	
Depressa	*Himantidium Papilio*	*Fragmenta incerta*	1
Pileus	*Zygodon*		2
	Navicula Undosa		3

6. In the interior of Africa, neither regular winds nor surfaces with red dust exist which could yield the dust of the regular winds. The sand of Sahara is white and grey: fog-dust of the regular wind is cinnamon-brown. The dust of the fog coast is consequently a foreign dust. Since, as is known by experience, an upper trade-wind corresponds on the peak of Teneriffe with the lower one ; and, as the latter is not an African land wind, but different from the Harmattan, it follows that the upper trade wind only can carry the dust to Africa ; and, as this probably does not blow across Africa, it falls, and changes into the lower regular wind, and deposits the dust there. The presence of South American forms in the dust of the trade winds first suggested this view, and is still favourable to it, the number of these forms having since increased. Thus the American dust, which has been raised in the equatorial region of the calms, and in the ascending (South American) currents of air, is carried to Africa by the upper trade wind, which blows towards the east, and therefore returns to America, when it has not been previously deposited in the dark sea, in consequence of this upper current descending perpendicularly, and becoming the lower trade wind, which blows towards the west.

7. In 1817, Admiral Roussin stated, in the *Nautical Magazine*, that these dust fogs prevail, falling perpendicularly, on the western coast of Africa almost the whole of the year, at the time of the Harmattan, from January to April, and extend themselves horizontally into the sea. The thick fog or haze prevails almost all the year on the coasts of N. W. Africa. Horsburg, in 1826, reported that they are constant near the Cape Verd islands during the north-easterly wind (trade winds). That something similar to this exists uninterruptedly throughout the year (*always*) in

Kaschgar, is mentioned by Sir Alexander Burnes, in 1837. Of the eastern coast of Sicily, it is reported by Gemellaro, in 1849.

8. That the dust near Africa is the coarsest, may indeed arise from its descending there directly from the upper part of the atmosphere, whilst it is mostly sifted further out at sea; but the dust of March 9th, 1833, is not coarser than that from San Jago of the Cape Verd islands in 1833. *The dust is, therefore, probably most coarse at the place of descent.*

9. The phenomenon is certainly quite independent of the seasons of the year, since it is observed without interruption in Africa, and almost in every month of the year in Europe; but in the calmer summer season, which is not so adapted for meteoric movements and deviations, it is less frequent. In Europe it is often, and even most frequently observed, in the midst of winter, although the ground is moist and covered with ice and snow.

Of 340 occurrences of the phenomenon, in only 199, or about three-fifths, the months are stated in which they occurred, and of these 118 fell in the first half of the year, and 81 in the second half.

January	27	July	9
February	14	August	17
March	23	September	7
April	18	October	18
May	18	November	16
June	18	December	14
	118		81

The winter half-year, from October to March, contains 112 cases; the summer half-year, from April to September, eighty-seven; consequently about an equal proportion.

10. It is remarkable that North America has not been frequently visited by the dust, nor any vessel in the great Pacific Ocean; from which it may be inferred, that the constant dust-fog zone of the upper region of the atmosphere is peculiar to the Atlantic north-trade wind-zone, and over America, where it appears to commence in the south; in the north and over the Sandwich Islands it is quite wanting; and consequently it cannot be thrown down by fire-meteors and falls of meteoric stones.

11. According to present observations, the dust-fog zone of the atmosphere of the earth, which is sometimes 1600 miles, and according to the observations of Tuckey, 1800 miles broad, would, if seen from a distance, represent a loop over the Atlantic ocean, in the region of the northern tropics (the region of the zodiacal light), with a stripe or second loop (deflection, continual descent) across the Mediterranean and its continuations towards Central Asia.

12. The frequent occurrence of fire-meteors and falls of meteoric stones with the cinnamon-coloured dust of the regular winds, is very remarkable. Before the birth of Christ meteoric stones appear to have fallen eighteen times under similar circumstances. It is, however, not quite certain whether they were simultaneous; and it is difficult to distinguish volcanic eruptions. Some might, however, be assumed to be correct, as those of the years 217, 215, 207, 169, 102, 94, 42. Fourteen have been observed subsequent to the birth of Christ, making altogether thirty-two. In one case only (1813) has the dust, which accompanied the stones, been examined. The prevailing desire to possess solid meteoric stone, and the inattention still paid to the accompanying dust, makes the examination of both together difficult. Future generations will be more circumspect. Five cases of igneous phenomenon and blood-rain combined have been noticed before the birth of Christ, and two subsequently, viz., 1483 and 1813. Six meteor stones, without igneous phenomenon, but with blood-rain, fell

before the birth of Christ, and two afterwards, viz., 1618 and 570. With yellow vapour and dust, three fell after the birth of Christ, viz., in 570, 897, and 1814. Fire meteors, with and without falls of stones, accompanied similar falls of dust, before the birth of Christ, in twenty-one cases; after the birth of Christ in thirty-eight, making altogether fifty-nine cases. Although some of these numerous cases are not well established, some may still be relied upon (1548 and 1559). Whilst the sky was perfectly clear, showers of dust and blood-rain fell suddenly four times before Christ, and nine times after Christ, making together thirteen times. The meteors of 1056, which fell in Armenia, of 1560 in France, and of 1797 in South America, deserves great attention. Also the fog of the dark sea falls daily whilst the sky is clear.

13. Although we cannot deny the accuracy of the various analyses of the dust of the regular winds, and must admit their value, yet it would still be very hazardous and improper to assert unhesitatingly that all moveable celestial lights and meteor stones are terrestrial products. Many things may exist, and be generated in the universe; some (since Kepler and Chladni), regarded as cosmic, will be found to be terrestrial, and have actually become so. The brilliant chapter in *Cosmos*, written with so much enthusiasm, on cosmical mists, comets, and asteroids, sufficiently restrains all terrestrial phantasies which too firmly cleave to the earth; but the spirit purified from terrestrial mist, its light reflections and concretions, must return unfettered into the regions of unbounded thought.

14. The sirocco and south wind [*Föhn*] carry with them the same forms and mixtures as the Atlantic dust of the regular winds. Their heat is not necessarily derived from Africa, but may perhaps arise from condensation of the dust (see *Kosmos*, i, 158).

15. Although it is quite impossible that all dust-whirlstorms can take their origin from one and the same narrowly circumscribed spot, yet it is fully established that the specimens of dust brought for the last forty-six years (since 1803) by all the examined regular siroccos and south winds, from the Atlantic ocean to the Tyrol and Salzburg, resemble one another in colour and in the most minute particulars of their composition. Whenever, therefore, any whirling movement of the air penetrates so far into the upper strata of the earth's atmosphere that it reaches the upper very thinly extended, and sometimes very crowded dust-clouds of the dust-fog current, whose mass has become homogeneous by being continually mixed for perhaps many thousands of years, then such a hurricane, sometimes blowing from America, sometimes from Africa, would carry with it cinnamon-coloured dust of homogeneous composition.

16. The columns of gas which are continually rising over active volcanoes may also occasion upper whirling movements, certain mixtures and deviations of the dust-fogs (and volcanic-like phenomena have often been noticed as simultaneous with blood-rain) which formerly were indeed not distinguished from the effects of violent hurricanes, whilst, even if they stood in a direct connexion, such showers of dust would be incorrectly termed volcanic.

17. The dust-fog of the distant atmosphere of the earth, raised and supported by the aërial current, the rotation of the earth and electric tension, although known by experience (*Al. v. Humboldt, Ross*) to be peculiarly transparent, must necessarily, if it does exist, give peculiar reflections of light, perhaps also electrical luminous appearances. The latter must, on account of the currents, have a streaky appearance, and be, from the constantly rapid movement of the mass, dim and visible. Whether the regular appearances of some of the known streaky, dim, celestial lights are to be thus explained, I will reserve, on account of the novelty of the idea, for future elucidation.

18. The difficulty which existed in imagining such a quantity of solid

substance as is required for one meteoric stone of one cwt., suspended in the air, and so rapidly united, is now removed by the fact, that a single regular wind meteor has often carried thousands, and hundreds of thousands, of cwt. of solid substance, and with from 7 to 14 per cent of iron, 30 per cent of siliceous earth, and 16 per cent of alumina ; and that the quantity which continues to fall near Africa, in the dark sea, upon an area of more than one million of miles, is incalculable. All the known falls of meteoric stones taken together are insignificantly small in amount when compared with the capability of the atmosphere. It now only remains to inquire whether the measurements of height and of velocity of fiery meteors and meteoric stones will invariably admit of the assumption of the cosmical origin and course of these phenomena. A few only of these observations are to be relied on, and the shallow impression (often only one foot deep), which some meteoric stones make in loose earth, as well as the slight concomitant phenomena of compression of the air, do not agree with the velocity of cosmical bodies, even if we were to suppose that it had been lessened by a spiral revolution round the earth, and by explosion. A whirlstorm might perhaps also, at an elevated part of the atmosphere, rapidly unite, at one spot, the existing fogs, as it were, into one mass, and what influence a high degree of electricity might then have in arranging, according to their affinities, the different constituents of the infused mass, or infusing them together, is perhaps as little to be comprehended as the power of volcanoes. Whether nickel is contained in quantity sufficient to explain the presence of carboniferous and nickeliferous sulphuret of iron, will be further investigated.

19. One of the most important discoveries is the almost always partial but frequently enormous quantity of living beings contained in the different sorts of meteoric dust. Of forms capable of living, and provided with ovaries and green granules, or of such as actually move, only nine species have been discovered in the dust of the regular winds.

Eunotia amphionys	Monas viridis
Tinnularia borealis	Spirillum Undula
Synedra Entomon	Conferva tenuissima ?
Fragilaria Synedra rhabdosoma	Ulva

But many more species have been found in the common dust of the atmosphere, which were communicated in 1848 and 1849. Each of the very small particles examined (as large as the head of a pin), of some sorts of sirocco dust, contained some, or at least one animalcule capable of life ; *Eunotia* and *Tinnularia* were very common. Animals in full life were contained in the ink-rain of Ireland, in 1849.

20. Some of the events that have occurred in the history of certain nations stand in connexion with these sort of meteors, partly alone, partly in conjunction with other circumstances. To these we may refer the emigration of the Jews from Egypt 1576 years before Christ ; more certainly the battle between the Moabites and Jehoram 900 years before Christ ; the battle of the Koreishite Arabs and Christians near Beder, as the first basis of Islamism, 570 years after Christ, the anthropogenetic ideas of Mahommed in opposition to the Mosaic. The erroneous conception of the dark sea prevented the discovery of America until the time of Columbus. The darkening of the sun during the battle of Mühlberg, in 1547, when the Prince-Elector of Saxony, Johann Friedrick, was taken prisoner by the Emperor Charles V., and when the succession to the throne was transferred from the Ernestine to the Albertine line, served also, by the way in which Kepler conceived it, to explain the system of the universe. The sirocco-storm, with blood-rain, in 1553, which was followed immediately by the defeat and death of the Prince-Elector,

Moritz of Saxony, in the battle of Siversliausen. That such meteors have been the cause of human sacrifices for the purpose of conciliating the Deity, we know from the times of Romulus. Great ecclesiastical ceremonies have been instituted even in modern times (1813) by entire populations, in consequence of such meteors, as they were in the most ancient times, even when unaccompanied by any great damage, and have always greatly excited the mind.

21. This communication does not treat of mineralogical terrestrial dust, nor of astronomic cosmical dust, nor of simple meteoric currents of air, but of the influence of a hitherto mysterious sort of organic life in its relation to the general state of the atmosphere of the earth. Physiology, of the study of which it is a fruit, will obtain from it a broader basis and more intense application.

TESTS OF THE PURITY AND ADULTERATION OF THE VOLATILE OILS.

BY G. H. ZELLER.

1. Ol. Amygdalarum amararum.

This oil possesses, besides its great *specific gravity* and peculiar *smell*, so many striking chemical characteristics, that any adulteration of it must be easily detected. To these characteristics belong its great, clear solubility in *sulphuric acid*, with a reddish-brown colouration, and *without any visible decomposition*; the *very slow* action which *nitric acid* has upon it, without either of the two substances undergoing any change in its physical properties; the *only partial* slow solution of *iodine* without further reaction; the indifference to *chromate of potash;* the elimination of crystals from its solution in *an alcoholic solution of caustic potash;* the peculiar inspissation by *caustic ammonia* and *muriatic acid*, and the elimination of crystals from the alcoholic solutions of these new compounds, and, lastly, the decidedly *acid reaction*; in short, almost by every reagent some peculiarity of this oil is displayed, by which its purity can be perfectly and easily established.

2. Ol. Caryophyllorum.

The properties which this oil possesses, afford great opportunity for discovering its purity. Firstly, its relation to the *alcoholic solution of caustic potash*, with which it congeals entirely into a crystallic mass, *totally losing at the same time the clove odour*. Any foreign substance present would be excluded from this compound, or would interrupt and weaken it. Similar to this, and equally marked, is the butyraceous coagulum, which is obtained by shaking the oil with a solution of caustic ammonia, and which, after fusion, crystallizes. The *spontaneous* ready decomposition by *nitric acid*, and simultaneous formation of a reddish brown *solid* mass, as also the *dark-blue* colouration of the oil by a small quantity of *sulphuric acid*, whilst a greater proportion of the latter changes the oil into a blood-red *solid* mass, are equally striking tests. To these, we may add the *perfect decomposition* of the oil into brown flakes by *chromate of potash*, accompanied by the *loss of the yellow* colour of the solution of this salt; the solubility of *iodine*, which forms with it a *liquid* extract, with but a small increase of temperature, and also the *perfect* and easy solubility of santaline in it.

3. Ol. Cinnamomi.

With this oil, the question is not merely to detect an adulteration with other oils, but also to distinguish the two sorts of this oil from one another, viz., the Ceylon oil (*oleum cinnamomi verum*) and the Chinese oil (*oleum cassiæ*) which differ very much in price. In both cases it is difficult to

obtain accurate tests of the properties of these oils, as they are almost exclusively obtained by way of commerce, and vary considerably in their qualities, on account of their age and careless method of preparation.

The chief distinction between the two oils is the *odour*—the Ceylon oil is moreover more liquid, and of a less specific weight than the Chinese, and may be exposed to a greater degree of cold than the latter without becoming turbid. The most distinguishing characteristic of the cinnamon oils, is, perhaps, their relation to the alcoholic solution of caustic potash, both dissolve in it readily and *clear*, with a reddish yellowish brown colour; after some time, however, the solution becomes *very turbid*, and a rather heavy undissolved oil precipitates, whilst the solution gradually becomes clear again.

Another peculiar character is, where the oil is being decomposed by *nitric acid*, a smell of bitter almond oil is perceptible. Both oils are at the same time converted into a brown balsam; in the Ceylon oil a brisk decomposition occurs sooner, and at a slighter heat.

Iodine dissolves rapidly in the Ceylon oil with a considerable increase of heat, and a slight expulsive movement, a tough extract-like substance remaining behind. With the *Chinese oil* the reaction *is slow*, the development of heat but *very slight*, quiet, and the residue a *soft or liquid* substance.

Chromate of potash decomposes partially the *Ceylon oil* into brown flakes, which are suspended in the solution. This is *deprived of its yellow colour*, whilst the undecomposed portion of the soil assumes a yellowish light red colour, and becomes thick. The solution, treated with *Chinese oil*, does not *entirely lose its yellow colour*, contains *no* flakes, and the oil, turbid, emulsive-like, does not become clear again.

Sulphuric acid also furnishes a good test for these oils; the *Ceylon oil* forms with it a *solid*, hard mass, changing from a brownish-green into deep black; in the *Chinese oil*, this substance is softer, and *deep olive-green*. A smaller quantity of acid colours the oils *purple-red*, whilst *muriatic acid* imparts to them a violet colour.

4. Ol. Sassafras.

This oil is distinguished from most other oils by the *clear* solution produced by iodine *without inspissation*. The *green* colour which is at first produced by two parts of oil and one part of sulphuric acid, is *not produced with any other oil;* by heat, this colour changes to *blood-red*. A greater quantity of oil produces in the heated acid a magnificent amaranth red colour, whilst the oil itself appears only brownish or blueish-red. With *nitric acid* the decomposition takes place *without heat*, and reddish-brown resin is formed, which, on being heated, becomes hard and brittle. The great specific gravity and the low degree of solubility in alcohol will easily lead to the detection of an admixture of the latter which would counteract these properties.

5. Ol. Anisi stellati.

This oil participates in many properties of those oils of the umbelliferæ which contain much stearoptene. Its combination with *iodine*, which takes place with a less development of vapour and heat, congeals into a *solid* resinous substance. By *sulphuric acid*, this oil also becomes easily inspissated, is changed into a *solid* mass, and becomes by heat dark *blood-red*. *Nitric acid* however produces only a thick fluid balsam, whilst the oil becomes yellow, and by heat reddish-brown. The difficulty with which the oil is dissolved in five or six parts of alcohol, and in the alcoholic solution of caustic potash, with slight colouration, as also its relation to cold, are useful tests.

6. Ol. Anisi vulgaris.

The *constant specific gravity* of the ol. anisi (from 0.97 to 0.99, and still more frequently from 0.98 to 0.99) as well as its disposition to congeal readily at below a medium temperature, are good tests for this oil. But still more so is its *quick* congelation into a *solid hard mass* with *iodine*, accompanied with a perceptible increase of heat, and the development of yellowish-red and grey vapours. *Sulphuric acid* heated with the oil, produces a beautiful purple red colour, and quickly inspissates and hardens it. The other reactions are similar to those of oil of star anise, and will, combined with those here mentioned, sufficiently characterize this oil.

7. Ol. Rutæ.

The high price and strong smell of this oil lead to, and facilitate its adulteration. If prepared in the laboratory, this oil is distinguished by being slowly dissolved by iodine, *unaccompanied by any external signs of reaction*, and the formation of a *slightly viscid liquid;* by this means, adulterations with oils of Coniferæ, Aurantiaceæ, and most Labiatæ can be detected in it. *Nitric acid* acts but slowly upon it, and changes it into a greenish yellow thin liquid balsam; chromate of potash produces no reaction. By the *turbid* solution *in alcohol*, by the reddish-brown solution in liquor potassæ, and by the similar but darker colouration which the oil and the acid assume by *sulphuric acid*, the cheaper oils of the Labiatæ may be easily detected in it. The commercial oil compared with these characteristics appeared to be only an adulterated one.

8. Ol. Cajeputi.

Omitting the tests for less frequently occurring adulterations of this oil I confine myself to mentioning only those tests of its purity which are the result of my experiments, chiefly with regard to the *rectified oil*, which alone ought to be employed for medical purposes.

The first of these is the nature of the residue, resulting from the reaction of *iodine*. After a slightly energetic reciprocal action, during which the temperature was but little increased, and the development of yellowish-red vapours but slight (in another crude oil no such development took place), the residue immediately becomes inspissated into a *loose coagulum*, which is soon changed into a dry, greenish-brown, brittle mass. Fulminating oils are therefore easily detected, also the more energetically *acting* oils of the Labiatæ; viz., ol. lavendul. spireæ, origani. But also the less violently *acting* oils of Labiatæ, such as ol. rorismarini, which serves most frequently for adulteration, but which are distinguished by the energetic action of a solution of iodine, can be recognized by the degree of energy with which this reaction takes place; all, however, would materially alter the nature of the residue of the iodine test described above. The ol. rorismarini manifests under certain circumstances, also, some coagulating solid parts in its residue, but which always has the consistency of a soft extract.

The slight changes of colour, which are produced by chromate of potash, are somewhat more marked with the ol. rorismarini, but the equally slight colour of the solution in liquor potassæ, which is clear in the cold and turbid when warm, is the same in the ol. rorismarini. The latter oil could not be detected by the *sulphuric acid* test; the latter assumes a deep red yellowish colour, and the oil becomes brownish; by this, however, many other adulterations may be indicated. The weak colouration of the ol. cajeputi by *nitric acid*, which imparts only a reddish and brownish colour, accompanied by a violent reaction and formation of a liquid balsam, will easily distinguish it from some other oils, but not from ol. rorismarini.

Its relation to iodine is, therefore, the safest test: it can also be recog-

nised by a sensation of cold which it leaves behind in the mouth. Its specific gravity being below 0.91 to 0.92, will show the presence of lighter oils and alcohol, and a divided rectification, and its relation to water will detect the adulteration with camphor.

9. Ol. Menthæ piperitæ.

Any adulteration of this oil, except with alcohol or other mint oils, could be easily detected by the peculiar smell and taste of this oil. The presence of alcohol is betrayed by the specific weight, which is seldom under 0.90, and which must be considerably lower, if the alcohol be stronger. Of the other mint-oils we certainly are only acquainted with that of *M. crispa* and *crispata*; we may however conclude from the deviating relation of the ol. menth. piperit. to *chromate of potash* and to *iodine*, that the other sorts differ from it chemically, as well as the plants from which they are obtained differ from one another in smell.

The most distinguishing character, which the peppermint-oil shares with *no other oil of the Labiatæ*, though with some of the compositæ, is its relation to chromate of potash, which communicates to it a *deep red-brown colour*, and inspissates it into a coagulum more like an extract than a resin, and by motion is divided into a flaky form, whilst the solution of the salt *soon loses the whole of its yellow colour*, or appears yellowish-green.

The purple-red colour imparted to the oil by the fourth part of its volume of *nitric acid*, is, at least for the qualities of 0.89 to 0.90, very characteristic. The other oils, which become merely brown, show at least a tendency to red, but all, upon an addition of acid at a higher temperature, change to reddish-brown and into a liquid balsam.

10. Ol. Thymi.

This oil is distinguished by no peculiarity, and, in most cases, where it is employed as perfume or externally, its pure and fine smell will be a sufficient criterion. By its slight reaction upon *iodine*, the adulteration with turpentine-oil might be detected, whilst its stronger reaction upon chromate of potash would serve to detect other admixtures.

11. Ol. Lavendulæ.

This delicate oil suffers no other admixture but that of alcohol, without becoming worthless, and in the inferior cheap qualities which are sold, the presence of alcohol is discoverable by the specific weight. Of seventeen samples examined, the lowest specific gravity of the inferior oil was 0.86; that of the best qualities, mostly 0.87 to 0.89. The peculiar character of the lavender-oil by which it is distinguished, with regard to the degree, from *all oils obtained from the labiate*, is its *quick and violent fulmination* with *iodine*, and the entirely changed, pungent, acido-balsamic smell of the soft, extract-like residue. This character is invariably observed in all genuine oils, both commercial, and those prepared in the laboratory. The inferior, cheaper, commercial sort, *does not fulminate!* An intentional addition of one-third of alcohol did not perceptibly weaken the fulmination; also, one-half of alcohol did not destroy, but only weaken it; an equal volume of alcohol being added to the oil, no fulmination took place, but a lively ebullition and development of yellowish red vapours. A moderate proportion of alcohol cannot, therefore, be discovered by these reactions; for this purpose, the almost indifferent relation of the pure oil to santaline is a safer guide, as that containing alcohol *dissolves the latter readily and quickly*. An adulteration with fulminating oils, which in this case cannot be detected by *iodine*, would be discovered by the differing relation to caustic potash. The alcoholic solution of the latter forms a clear solution with lavender oil, to

which it communicates *a dark, yellowish-red brown* colour, whilst the other oils are dissolved in it with difficulty, and become turbid, with but a slight colouration. Among the better tests, we may also reckon the deep reddish-brown colour produced by *sulphuric acid*, accompanied by a strong inspissation, whilst the equally coloured acid has a slight shade of yellow.

12. Ol. Cubebarum.

This oil, which is *devoid of oxygen*, differs from others *having a similar composition* by its *viscidity* and *weak* action upon *iodine*, which imparts to it at the beginning of the reciprocal reaction, a *violet* colour. Even absolute alcohol in large proportions, and at a high temperature, forms a solution which is *mostly clear*; equal weights produce a *very turbid* solution, throwing down flakes. The oil, which is strongly clouded by *nitric acid*, becomes by heat only pale red, but is decomposed and converted into a consistent resin. *Sulphuric acid* assumes a red colour, the oil becoming crimson. These characteristics will suffice for this oil, which is already difficult to be adulterated on account of its viscidity and want of colour.

13. Ol. Bergamottæ.

The oils of the aurantiaceæ are in a still higher degree than the lavender-oil, protected by their delicate odour from adulteration, except with alcohol; on the other hand, a mixture of these oils with one another, is easier effected, and detected with greater difficulty. There might, however, be but little inducement for doing this, except in the case of ol. flor. aurant., which is proportionately much dearer than the others. The similarity of the respective chemical properties admits also here of no better test than the smell. The unvarying and great specific gravity (from 0.87 to 0.88) will serve to detect any admixture of alcohol. The relation which the bergamot oil has to this solvent, shows distinctly the difference which exists between its own proportion of oxygen and that of the other oils of the same family; it is readily dissolved in alcohol, but, like the other oils, it makes, at least, when fresh, the solution opaque. It is also distinguished from the lemon and orange oil, by being easily and clearly dissolved in *liquor potassæ*. This difference in its elements is also manifested in the reaction upon iodine, not so much with regard to its fulminating property, which, although weaker than in the lemon oil, is rather stronger than in the orange oil, but by the homogenous nature of the residue, which, in the two last mentioned oils, and in all oils free of oxygen, consists of two combinations, differing in consistency. By the incapacity of dissolving santaline, this oil is, as well as the others of the same family, protected against an admixture of alcohol. One part of alcohol added to five parts of the oil is hardly able to impair the fulmination; two drops of alcohol added to three drops of oil produce certainly no real fulmination, but still a lively reciprocal action with effervescence.

14. Ol. Copaivæ.

Small proportions of turpentine-oil cannot easily be detected in this oil, as both react in most cases, in the same manner. A chief distinction is the weaker fulmination of the ol. copaiv., as also the circumstance that the latter requires *double the quantity of alcohol* for its solution, which, notwithstanding, still remains turbid. Also, its relation to *sulphuric acid* is somewhat different; the latter becomes yellowish brown-red, but turpentine oil lively yellowish-red.—*Jahrb. für Praktische Pharm.*, Juli 1849.

ON OIL OF PEPPERMINT.

BY B. SANDROCK.

Mr. B. Sandrock, of Hamburg, states that American oil of peppermint is adulterated with oil of turpentine, which appears to be the product of some other species of *Pinus* than ours. He has frequently rectified quantities of from 80 to 100 pounds of the American oil, in which the smell of oil of turpentine was distinctly perceived; but not to such a degree as would be the case if common oil of turpentine had been employed.

Several samples of English oil of peppermint were found by the author to be mixed with this American oil of peppermint, the price of which is only five or six marks per pound. Bley has also perceived this smell of turpentine in the oil of peppermint.

The smell, however, is no certain criterion in this case, and the adulteration is better discovered by the relation to iodine and alcohol, and by the specific gravity. Pure English oil of peppermint has a specific gravity of 0.910 to 0.920; it does not explode with iodine, but forms with it a homogeneous mass, and is soluble in its own weight of alcohol.

The American oil, in which a great proportion of oil of turpentine is supposed to be contained, is sold by the name of *crude oil*, in tin bottles of twenty pounds. It is of a yellowish colour, very resinous, often as thick as oil of almonds, and has a strong accessory odour of oil of turpentine. Its specific gravity is 0.855 to 0.859. When distilled with water, half of it passes over with equal parts of water, then the proportion of the water increases, and with the last yellow, somewhat thicker parts of the oil are distilled over, but with difficulty. About five-sixths of the crude oil are obtained perfectly clear like water. The first half of the rectified oil has a specific weight of 0.844, which increases, so that the latter portions have a specific gravity of 0.875 to 0.880. The oil retains now as before the smell and taste of turpentine, is only dissolved in five or six parts of alcohol, and explodes strongly with iodine. The resin which remains after the distillation, amounts to about four or five per cent. of the oil, is soft, yellowish, turbid, and strongly smells of the oil. Heated for some time at a slight temperature, it changes these properties for all those of the pine resin.—*Pharm. Central Blatt*, 1850, No. 12.

NOTES ON THE PURIFICATION AND PROPERTIES OF CHLOROFORM.*

BY WILLIAM GREGORY, M.D.,
Professor of Chemistry in the University of Edinburgh.†

1. Chloroform has been prepared both from alcohol and wood-spirit. The latter has been used for the sake of cheapness; but as it is a mixture of several liquids, all of which do not yield chloroform, it gives an impure product, in a proportion which varies much, but is always below that obtained from alcohol. There is therefore not only no advantage, but the contrary, in using wood-spirit, which is not, after all, much cheaper than alcohol.

2. But the chloroform from these two liquids, *when fully purified*, is quite identical in all its properties. Its smell, density, boiling-point, and action in the system, are in both cases exactly the same. That from

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* Although I am alone responsible for the opinions contained in this paper, it is my duty to state, that all the experiments and observations mentioned in it have been made by me in concert with my able assistant, Mr. Alexander Kemp, of whose ingenuity and accuracy I have had constant opportunities of judging.

† Read before the Royal Society of Edinburgh, March, 1850.

alcohol is no doubt more easily purified than the other, but it also contains certain volatile oily impurities, which must be removed before it can be safely used. The peculiar oils which adhere to both kinds of chloroform are not identical, or at least not all identical, but they are of analogous constitution and properties.

3. Soubeiran and Mialhe have examined these oils. They contain chlorine, have a disagreeable smell, and when inspired or smelt cause distressing headache and sickness. In the case of wood-spirit, some of its own impurities distil over unchanged, and are also found in the chloroform.

4. It is well known that many persons, after the use of chloroform, have suffered from headache, nausea, and even vomiting, as I have more than once seen. Headache and nausea I have myself often experienced, when I have tried different specimens of chloroform, without taking so much as to produce the full effect.

5. Perfectly pure chloroform does not, so far as I have seen or experienced, produce these disagreeable effects. It is therefore highly probable that when they occur, as they do with some individuals, from the use of chloroform of more than the average goodness of quality, they depend on the presence of a trace of these poisonous oils.

6. All good manufacturers of chloroform purify it by the action of oil of vitriol, which destroys the oils, while at the same time a part of the acid is reduced to sulphurous acid. The chloroform, to remove this, is then distilled with lime or carbonate of baryta, and is tolerably pure if the process be well conducted.

7. But it is not quite pure, and contains a trace, more or less distinct, of the oils. I have found this to be the case with all the best chloroform made here up to 1849; and I have several times seen headache and sickness from the use of such chloroform, which was the best anywhere made. I must add, however, that the quantity of oils in the chloroform of the best Edinburgh manufacturers, although variable within certain limits, was always so small, that that product was fit for use, and only caused headache, &c. in a few peculiarly sensitive persons.

8. It was desirable to have a test for these impurities, as well as an easy and effectual mode of removing the last traces of them, especially as many sorts of chloroform not made here were far inferior in quality to that prepared in Edinburgh. One very delicate test is, that of oil of vitriol, which should be quite colourless, pure, and of the full density of 1.840 at least, as it may be obtained by Mr. Kemp's process, lately read to the Royal Society; when agitated with the chloroform, it becomes yellow or brown, from its action on the oils, which it chars and destroys. Any change of colour is easily seen by contrast with the colourless chloroform which floats above. Pure chloroform gives no colour to the acid. It is essential that the oil of vitriol be colourless and also of full density; for if coloured, it is not easy to see a slight change on its colour; and if below the proper density, that is too weak, it is not much coloured by a chloroform which will render dark brown the acid of proper strength.

9. Another test, still more delicate, I find to be the smell of the oils. When chloroform is poured on the hand or on a handkerchief, it rapidly evaporates; but the oils, being less volatile, are left behind; and their smell, previously covered by that of the chloroform, is easily recognized. Until very lately no chloroform was sold, or indeed known, which would stand this test, or even the former.

10. Up to 1849 the best commercial chloroform had a specific gravity of 1.480, which was considered a guarantee of its purity; but it had been obtained by chemists of specific gravity 1.494, and even 1.497. I have found that chloroform of 1.480, when once more acted on by oil of vitriol, which destroys the oils and becomes brown, may be obtained after re-

moving the sulphurous acid, of specific gravity 1.500 at 60°. This I take to be the specific gravity of pure chloroform. Our best makers have lately, much to their credit, pushed the purification so far as to furnish chloroform even of this highest density, and also in other respects such as it ought to be.

11. There are still, however, many makers in other places whose chloroform is not so pure; and I shall now describe the method which, with Mr. Kemp, I have employed for purifying, perfectly and easily, any commercial chloroform, except one remarkable specimen—a process which will enable any medical man to purify it for himself with the greatest facility.

12. The chloroform, having been tested as above, and found more or less impure, is to be agitated with oil of vitriol (half its volume will be sufficient), and *allowed to remain in contact* with the acid, of course in a clean, dry, and stoppered bottle, and with *occasional agitation* till the acid no longer becomes darker in colour. As long as the action is incomplete, there will be seen, after rest, at the line of contact, a darker ring. When this no longer appears, the chloroform may be drawn off, and for greater security once more acted upon by a quarter of its volume of the acid, which should now remain colourless. It is now to be once more drawn off, and in a dry stoppered bottle mixed with a little powdered peroxide of manganese, with which it is gently agitated, and left in contact until the odour of sulphurous acid is entirely destroyed, and the chloroform has acquired a mild, agreeable, fruity smell. It has then only to be poured off into a proper phial. It will now leave no disagreeable smell when evaporated on the hand. [If the commercial chloroform, after having been *frequently well shaken* and *left for some time in contact* with the acid, has given to it only a moderate tinge of colour, it is probable that it may be completely purified by the first process. To ascertain this, test a fresh portion in a tube with fresh acid, shaking well and allowing it to stand for some time. If it do not colour the acid at all, then the whole chloroform has only to be finally purified by the oxide of manganese. If the acid become coloured in the test-tube, it will be as well to act on the whole chloroform a second time with fresh acid till it stands the test. Mr. Kemp has observed, in repeating this process for me, the very curious fact that, as soon as the action is complete, and the oily impurities are destroyed, but not sooner, the chloroform tested with the acid in a tube, exhibits a strongly convex surface downwards, where it rests on the pure acid, or, what is the same thing, the acid becomes concave at its upper surface. The smallest trace of impurity, not sufficient to affect the density of the chloroform, we have found to render the line of junction horizontal. It is probable that this may become a valuable test of the perfect purity of chloroform; but we shall not say more on this subject until we have thoroughly examined it.] This process requires no apparatus beyond a few stoppered bottles and a *pipette*, if we wish to draw off the whole chloroform without loss, although nearly the whole may be simply poured off. The use of the oxide of manganese is due to Mr. Kemp; and on the large scale the chloroform may be filtered through a cylinder full of it. In this final purification of commercial chloroform, no distillation is necessary. Indeed, no rectification is required at all, if it be well washed with water before using the acid.

13. It may be considered as certain, that the use of chloroform thus purified will very rarely, if ever, cause the disagreeable effects above noticed.‡ As to more serious bad results from the use of chloroform, so

‡ Dr. Simpson informs me, that the purest chloroform he has used not unfrequently causes vomiting. On further inquiries, I find that this occurs when it is administered after a full meal. This can easily be avoided, and must not be confounded with the

often spoken of elsewhere, it is enough to state that a large proportion of the cases must be attributed to the use of a liquid so impure as hardly to deserve the name of chloroform at all.

Postscript.—Since writing the above, my attention has been called to a paper by Dr. Wilson, on the specific gravity of chloroform, which he was not able to obtain higher than 1.498. I have therefore to add, that every specimen, whether of specific gravity 1.480, 1.490, or 1.497, which I purified as above, acquired the same density of 1.500, as ascertained by the use of a very delicate and accurate bead (made by Lovi), which sank at 60.°5 and rose at 59.°5 ; and also by three successive weighings with a very delicate balance. It will also be seen, that three commercial specimens had this density ; I could detect no foreign matter in my chloroform ; and besides, every foreign matter that is likely to occur *lowers* the density. I have no doubt that Dr. Wilson's specimens would have coloured the acid and left a smell on the hand.

I may add, for the maker, that, after distilling the materials which yield chloroform, no distillation or rectification is needed. He has only to wash the heavy fluid with water till its volume no longer diminishes, and then to use the oil of vitriol as above, finishing with the oxide of manganese. Distillation with the acid is of no use, because no proper contact can take place, the chloroform distilling from the surface as it would from mercury. In testing by oil of vitriol, it is best to use some ounces of chloroform, and to shake it in a phial, because in a test-tube, the colour produced, if not strong, may be overlooked.

While I acquit the makers of chloroform, who have sold an impure drug, of all desire or intention to adulterate it, I feel it my duty to point out, that the system which permits *any one* to set up as a manufacturer of this or any other potent remedy, without let or hindrance, without any test of his qualifications, without, in short, enforcing a knowledge of chemistry and pharmacy as an essential condition, is a radically bad one ; and that our law, in relation to Druggists and Apothecaries, requires reformation. In fact, the evils naturally resulting from it are only neutralized, and that but in part, by the good feeling and principle of the leading manufacturers.

To illustrate this, I may remark, that some of the makers of chloroform must have been very ignorant, even of what was known and published concerning its properties ; for, among the specimens I examined, are several of specific gravity below 1.480, which was long ago given as the standard, even so low as 1.347.

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headache, nausea and vomiting alluded to in sections 4 and 5, which symptoms are persistent, and occurred in my experiments always with an empty stomach, the experiments being made an hour or two before dinner. Mr. Carmichael, assistant to Dr. Simpson, has mentioned to me some facts which confirm the view I have taken. At one period, for more than a week, Dr. Simpson and Mr. Carmichael were kept in a state of continual anxiety by the occurrence, in all the puerperal cases in which chloroform was used, of very unpleasant symptoms, particularly of frequent pulse and other febrile symptoms, lasting for some days. At last, after much annoyance from this cause, it occurred to Dr. Simpson that he was using one particular specimen of chloroform above the average in quality. As soon as this idea occurred, he threw away all that remained, and returned to that which he had generally used. The unpleasant symptoms no longer appeared. [I regret much that I had not an opportunity of examining that specimen ; but I may add, that the maker, not an Edinburgh one, now produces chloroform of much better quality, though not yet absolutely pure.] But the striking fact is this, that Dr. Simpson and Mr. Carmichael state, *that during the period above alluded to, when that one kind of chloroform alone was used by them, their handkerchiefs became quite offensive from the smell left on them, which even adhered to them after washing.* There can, I think, be no doubt, that here the oily impurities alluded to in sections 4 and 5 were present in notable quantity.

That this neglect proceeded more from ignorance than from intention, is, I think, plain from the fact, that a specimen labelled "Pure Chloroform" actually contained only a trace, about one-thirtieth, of that substance. I did not ascertain its specific gravity, which must have been far lower than 1.200 or 1.100—nay, possibly, under 1.000, because its impurity was so obvious in every other respect, and the quantity I had was too small; but, on examining it further, I am convinced that its origin was this:—The maker, after distilling the materials, obtained, of course, two liquids, a lighter and a heavier. He evidently *did not know* that the latter was the chloroform, and therefore threw it away, and preserved the *lighter*—a mixture of pyroxilic spirit—of its natural impurities, of the deleterious chlorinated oils and a *trace* of chloroform. At least, such are its characters; and it exactly resembles what would be obtained in the way supposed. But what a fearful degree of ignorance (without any evil intention) is here exhibited! And yet this maker was free to produce and sell *pure chloroform*, which was actually almost *pure from chloroform*, and loaded with deleterious agents.—*Monthly Journal of Medical Science*, May, 1850.

TEST FOR THE PRESENCE OF CHLOROFORM.

Dr. Snow placed on the table, at a recent meeting of the Westminster Medical Society, the apparatus which he used for detecting the presence of chloroform in the dead body. He said that the process was a modification of one described in the *Journal de Chimie Médicale* for March, 1849. The blood or portion of the body to be examined was put into a flask, from which there proceeded a tube, which was made red-hot in part of its course. Another glass tube, attached to the extremity of the latter, was moistened inside with a solution of nitrate of silver, and terminated in a Wolfe's bottle, the interior of which was also moistened with the same solution. Heat being applied to the flask by means of the chloride of calcium bath, the vapour given off had to pass through the red-hot tube, and any chloroform which might be present was decomposed, and the chlorine and hydrochloric acid gas being set free, were arrested in the next tube, where they formed a white precipitate of chloride of silver, which became rapidly darkened in colour by the action of light. The nature of the precipitate could be further proved by cutting the tube with a file, and introducing a drop or two of nitric acid into one portion, and of solution of ammonia into the other. He had distinctly detected the presence of chloroform by this process in two kittens, killed by inhaling the vapour, on six successive days after the death of the animals, although no precautions were taken to protect the bodies from the air, and the quantity inhaled by each kitten must have been less than one minim. The parts of the animals examined were the viscera of the chest and abdomen, the brains, and the muscles of the body and extremities. From all these parts, clear evidences of the presence of chloroform were obtained. He had also obtained a precipitate of chloride of silver by operating on some portions of the muscles taken from the leg of a child amputated under the influence of chloroform at St. George's Hospital. The process indeed was one of such delicacy, that he had been able to clearly detect the presence of the hundredth part of a grain of chloroform when dissolved in a thousand grains of water. The only substances which could yield chloride of silver by this method, were, Dutch liquid, chloride of ethyle, and some other bodies similar in composition and effects to chloroform, and which, however, were not in common use, or even kept on sale. There were chlorides in the human body, but these could not be decomposed below a red heat, and certainly not till the part became dry; whilst in the process he employed, the heat to which the part under examination was exposed,

was only that of boiling water, or a very little more, and it could not become dry in the most protracted examination, as the greater part of the moisture given off became condensed in the tube, which inclined upwards, and flowed back into the flask. The method, therefore, was liable to no fallacy or objection. He had received from Mr. John Parrott some portions of the viscera of a woman, lately found dead, under very mysterious circumstances, in the Wandsworth Road. The parts had been closed up air-tight from the time they were taken from the body. They included a portion of the brain and of the liver, and though they were kept boiling for two or three hours in their own serosity, not the least trace of chloride of silver was obtained, whilst in the instances where chloroform had caused death, the precipitate began to appear when the heat to which the part was exposed reached to about the boiling point. In the muscle taken from the child's leg, the chloroform was only a few minutes longer in being detected, although the quantity present must necessarily have been much less than in a case where death had been caused by it. He therefore concluded that the death in the Wandsworth Road could not have been occasioned by chloroform.

ALLEGED USE OF CHLOROFORM.—(*Times.*)

I HAVE seen several cases reported lately of persons having been rendered insensible by a cloth being drawn over the face, which is generally ascribed to chloroform. Now, experience shows us that such a very instantaneous effect is not produced by this agent; but lately I was applied to for a liquid which I have known to occasion immediate insensibility by strongly smelling the bottle it was in; and no one could withstand its overpowering and suffocating influence when applied on a handkerchief suddenly to the face: it is the *Liq. Ammon. Fortiss.*, found in every Druggist's shop.

The person who applied to me for it was a tall man, in a smock frock, and stated he wanted it for a giddiness in the head. (Bosh!) I of course refused the sale of it, and warn all Druggists to do likewise, as I believe this to be the agent—and a most sure and effectual one it is—used on the occasions I have alluded to. A CHEMIST.

BOTANICAL AND PHARMACEUTICAL DESIDERATA.

(From the Manual of Scientific Enquiry, edited by Sir F. W. Herschel, Bart.)

(Continued from page 336.)

AMERICA.

Sarsaparilla.—To ascertain the plants yielding the several sorts of commerce, especially those called Jamaica Sarsaparilla (said to be the produce of the Mosquito Shore, and to be brought to England *viâ* Jamaica), Lima sarsaparilla, which comes to us from Costa Rica (can this be extracted from the plant which yields the Jamaica sarsaparilla?) Honduras sarsaparilla, and the Brazilian sarsaparilla.

Balsam of Copaiva is imported from several parts of Brazil: it varies somewhat in properties, and is considered to be the produce of several species of the genus *Copaifera.* It is desirable to obtain the balsam of each species, with a specimen in flower and leaf, and, if possible, in fruit, of the tree affording it, and the name of the district where the tree grows, and its *native* appellation there.

Balsam of Tolu and *Balsam of Peru.*—It may be said of these balsams, as of the *Storax* and *Liquidambar* of the East, that much confusion exists with regard to the substances so called, the same name being applied in different places to different substances, and different names to the same

substance. The trees respectively yielding, the countries producing, the mode of obtaining, the native names and the local ones of these articles, should be carefully sought and ascertained. Samples of the products must accompany the specimens of the trees.

Yellow-Bark, *Royal Yellow-Bark* or *Calisaya*, the produce of La Paz, requires to be identified with the tree which yields it. Specimens of the tree in fruit, in flower, and leaf, of the stems with the bark on and the bark removed, should be sent along with the description.

Ipecacuan, False.—From Brazil (the native country also of the true ipecacuan, *Cephaelis Ipecacuanha*) a "false ipecacuan" is derived? What plant produces the latter? What is its native name, and may it not be equally valuable with the true?

Cascarilla Bark.—It is important to trace the cascarilla bark of English commerce (from Jamaica, or the Bahamas?) and that of continental commerce (probably of Vera Cruz) to their true source. Are they derived from a species of *Croton?* and what particular kind?

Coca of Peru.—Ascertain the facts as to the consumption and effects of this substance (the foliage of *Erythroxylon coca*: see a long account in the *Companion to the Botanical Magazine*, vol. i. p. 161; and vol. ii. p. 25, tab. 21). A quantity would be interesting for chemical examination, not less than some pounds.

Quassia.—Why is *Surinam* quassia superseded by that from *Jamaica?* A comparative examination of the two barks chemically is required.

Angostura Bark.—To trace the different sorts to their true sources in Orinoco.

Tous les Mois.—A nutritive fecula, prepared at St. Kitts. From what species of *Canna* is it derived?

Contrayerva.—Is the Brazilian article yielded solely by *Dorstenia contrayerva*, or by other species too?

Copaiva.—To determine what species of plants afford the best and worst kinds respectively in Brazil.

Cinchona.—To trace accurately the true kinds to the trees *seen* to produce the barks in Peru?

False Cinchonas.—To obtain authentic samples of *Quinquina colorada* of Brazil, St. Lucia bark of Mexico, and Piavi bark (of Brazil).

Cevadilla.—To determine whether the *Helonias officinalis* or *Veratrum sabadilla*, both Mexican plants, is the best adapted for the preparation of veratrine.

Cohoon Oil.—The source is unknown of this solid oil, which resembles that from the cocoa-nut: it is said to be extracted from an *Attalea* (a kind of palm) in Mexico.

Barbados Aloe.—What species affords the drug thus called? Is it not a plant imported from Africa? No true aloe appears to be an original native of the New World, any more than a true *Cactus* is aboriginal of the Old World.

Many gums and drugs are said, in *Edwards's Voyage up the Amazon River*, to be exported from Pará, in Brazil. Whither are they sent? What are they? And what are the plants which yield them?

CHEAP PRINTERS' INK FROM ROSIN OIL.

One pound of rosin oil, thirteen ounces of rosin, and one ounce and a half of yellow soft soap, are melted together and stirred into an uniform mass. The consistency is regulated by the quantity of rosin-oil. The lamp-black and other colours are only added after the mass has become cold.—*Pharm. Central Blatt*, 1850, No. 13.

ON A NEW RE-AGENT FOR DETECTING THE PRESENCE OF SUGAR IN CERTAIN LIQUIDS.

BY M. MAUMENE.

This new re-agent is the bichloride of tin. M. Maumené has proved, contrary to the assertion of Liebig, that chlorine does act upon sugar, even in the dry state; that no higher temperature than 212° Fah. is required to produce that action. Even at ordinary temperatures the action takes place in a longer or shorter time, and in every case a brown matter, partly soluble in water, is formed, which assumes a brilliant black when dried. The chlorides—more especially the perchlorides—act in the same manner, and even with greater energy. When a solution of sugar and bichloride of tin is submitted to spontaneous evaporation under ordinary circumstances, what is the result? The mixture soon assumes a brown colour, more or less deep, and in about twelve or eighteen months, for instance, will be found to have changed into a firm jelly, of a shining black colour. The same result is much sooner obtained on evaporating the solution by the aid of heat. The bichloride of tin may be replaced by the bichloride of mercury, chloride of antimony, &c. All these bodies act upon sugar-like substances, having a strong affinity for water; they produce dehydration, and the formation of a caramel of a more highly carbonaceous character than the ordinary burnt sugar. All kinds of sugar are acted upon in the same way as cane-sugar. All the substances whose composition is analogous to that of sugar, and formed like it of carbon and water, equally undergo the same kind of alterations; lignin, hemp, linen, cotton, paper, starch, fecula, &c., &c., are all in this list.

Although, by the employment of this new re-agent, we cannot expect to be able to distinguish one kind of sugar from another; and though it may possess the inconvenience of causing us sometimes to confound sugar with other bodies, yet M. Maumené is of opinion that much benefit may be derived from its use in certain cases, and especially for the detection of diabetic sugar. It possesses the advantages of being able to be employed in the form of ordinary test papers, and of giving the greatest possible change of colour, on account of its great sensibility.

As neither paper, nor other material composed of cotton, linen, or hemp, will answer this purpose, on account of their ready decomposition by means of chlorine, M. Maumené recommends the use of a piece of white merino cloth for the purpose.

"After having steeped the cloth for three or four minutes in a solution of bichloride of tin, made by dissolving one hundred parts of bichloride of tin in two hundred parts of water, drained off the liquor, and placed it in another slip of cloth in a water-bath to dry, the re-agent is thus prepared, and may be cut into lengths of convenient size for use, like ordinary test papers. In testing for the presence of diabetic sugar in urine, it will only be necessary to place a drop of the urine on the prepared cloth, and expose it to the heat of the fire or the flame of a candle or of a lamp, when, in one minute, a black spot will be visible, if sugar be present. The sensibility of this re-agent is so great, that a mixture of ten drops of diabetic urine and one hundred cubic centimetres of water forms a liquid which will give a brownish black colour to the test cloth. This colour is not produced by the action of chloride of tin in either urea, uric acid, or urine in a healthy state.

"If I am not greatly mistaken," adds M. Maumené, "this reciprocal action of sugar and bichloride of tin, will become the basis of a new process in dyeing brown or solitaire; the colour will be obtainable at a low price, and will most assuredly be very fast."

SOLUTIO CANTHARIDIS ETHERIALIS.

This preparation has been introduced by Mr. Toynbee as a convenient form for the application of cantharidin.

Ether three parts,
Cantharides one part.

Exhaust by percolation.

ADULTERATION OF MILK.

A new adulteration of milk has lately been practised in Paris. It consists in adding a solution of dextrine. The fraud is easily detected by a solution of iodine, which yields a blue or reddish-blue tint with dextrine. By this test one part of a solution of dextrine, in one hundred of milk, can be detected.—*Journ. de Chem. Méd.*, Janvier, 1850.

MANUFACTURE OF ORCHIL AND CUDBEAR.

A patent was taken out on the 30th of August, 1849, for improvements in this manufacture, by Mr. James Robinson, of Huddersfield.

The patentee remarks that it has hitherto been customary, in the manufacture of orchil, to mix the lichens with liquid ammonia, to form a paste, which is turned over at intervals, to expose it to the action of the air, whereby a considerable time and amount of labour is lost ; and that his improvement in the manufacture of orchil consists in forcing the paste, prepared as heretofore, through the perforated bottom of a cylinder, by means of a plunger, into a receiver, whereby a greater amount of surface will be exposed to the atmosphere.

The improvement in the manufacture of cudbear consists in drying it more rapidly than has yet been practicable, by forcing the paste through orifices on to a surface lightly.—*Mechanics' Magazine.*

RUNGE'S CHROME INK.

Runge's chrome ink, which consists of the neutral chromate of potash, and an extract of logwood, becomes, according to Stein, perfectly permanent, and of a more intense black colour, by the addition of a few drops of a solution of corrosive sublimate.—*Pharm. Central Blatt*, 1850, No. 12.

WHITE ENAMEL FOR CEMENTING EARTHENWARE AND GLASS.

Four parts of red lead, two parts of white sand, and three parts of crystallized boracic acid are to be finely powdered, washed, mixed, and fused in a Hessian crucible. The mass is then poured on a sheet of metal and finely triturated. The powder is applied with mucilage of tragacanth to the broken pieces, which are then joined and heated in the muffle, but only to such a temperature that the enamel binds them firmly together, without completely fusing.—*Pharm. Central Blatt*, 1850, No. 13.

RED COLOUR FOR PAPER HANGINGS, &c.

It is proposed to employ the red chloride of chromium for the production of an intense red-violet colour, possessing metallic lustre, proper for printing or staining paper.

This product is prepared, as is well known, by passing a current of dry chlorine gas over a mixture of powdered charcoal and calcined oxide of chromium, inclosed in a glass tube. Attention must be especially given in this operation to the fact that, by reason of the difficulty of volatilization of the product, the chloride prepared by a first operation remains mixed with the powdered charcoal. It is therefore requisite to submit this mixture of charcoal and chloride of cromium to a second operation, taking care to cover the bottom only of the glass tube with it, in which case the product will be sublimed in the upper part of the tube. The heat of an Argand lamp, the flame of which is brought gradually upon the tube, will suffice for the formation of the chloride, which soon appears in the form of brilliant micaceous peach-coloured spangles. The chloride is then ground in a mortar, and thickened with a mucilage of gum. On being laid upon paper, it will display its original colour, and will resist the action, not only of acids and alkalies, but also the direct action of the solar rays.—*Newton's Journal*, April, 1850.

PREPARATION OF ROSIN OIL AND ROSIN GAS.

The rosin is to be well mixed with sawdust and quicklime, or caustic soda, and placed in cast-iron boxes, which are loosely covered with lids. Several of these boxes are introduced into a common gas retort, and the latter heated to redness. If oil is to be prepared, the gas is conducted into water, wherein it condenses, whilst the gas for illumination is conducted further on to the gasometer. By fractional distillation, paler and more volatile oils can be obtained from this crude oil. If oil merely is to be manufactured, the products are conducted from the first retort directly into one or two others, which are filled with coke, limestone, and bricks, and previously heated to redness.—*Pharm. Central Blatt*, 1850, No. 13.

SALE OF POISONS.

House of Commons, Tuesday, April 30th.

Mr. Stanford rose to move for a select Committee to inquire if any restrictions—and, if any, what restrictions—should be imposed by Parliament on the sale of poisons. The number of murders which had been perpetrated recently by poison, which could be procured with facility, particularly in the districts where it was used for agricultural purposes, was so great, that he was sure the house would agree with him in the necessity of putting a stop to it. He proposed a select Committee, that they might examine analytical chemists and medical men, with the ultimate view of introducing a bill to check the indiscriminate sale of poisons.

Sir G. Grey said, the question was one of considerable importance, and the honourable member was right in saying the practice of taking away life by such means had become more frequent than formerly. At the same time the detection of such crimes was extremely easy; and one advantage of the honourable member's motion was, that it gave opportunity for the expression of an opinion founded on experience, that the detection of murder by poison was so easy, that few of them escaped. The subject, however, was under the consideration of the Government, and a bill had been prepared on the sale of poisons. (Hear, hear.) If the honourable member had paid attention to the subject, he would know the great difficulty lay in the enumeration of the poisons to be included in the schedule, and he doubted if an inquiry, with the object of ascertaining, as the honourable member suggested, by an examination of Chemists and

medical men, what course ought to be taken, would not produce more harm than good, by enabling persons to have recourse to other poisons than those now used to destroy life. Under these circumstances, he hoped the honourable member would not press his motion.

Sir R. Inglis recommended the honourable member to withdraw his motion, after the intimation of the right honourable gentleman, that Government had prepared a measure to remedy the evil. He earnestly recommended the honourable gentleman to withdraw his motion, after the observations that he had heard from the right honourable baronet. There was no man who possessed such means of judging upon such a subject as the Secretary of State for the Home Department.

Mr. Bankes observed, that when the bill was brought in which the Government intended to introduce, it would be competent to the honourable member for Reading to propose that it be referred to a Committee upstairs.

Motion by leave withdrawn.

POISONING BY SHEEP DIPPING COMPOSITION.

A correspondent at Barnstaple has furnished the particulars of the following serious accident, which shows the danger arising from the use of arsenic for agricultural purposes:—

On Saturday, May the 18th, a farmer, about five miles from Barnstaple, invited a few of his relatives to tea and supper. The principal dish at supper was a rook pie. Pipes and beer were in requisition during the evening, and some of the beer was taken from a stone jar. After supper several of the party became sick, which was attributed to the pie, and five were obliged to leave the room. The beer which was left was handed over to the servants, and a man, a woman, and three boys partook of it. Early in the morning the village surgeon sent to inquire how the family were, as he had been up most of the night with three of their guests. Soon afterwards the farmer was alarmed at hearing the man servant and three boys vomiting in the yard. He and his wife were also attacked in the same way. The servants had taken none of the pie ; but all had drank some of the beer. This confirmed his suspicions, and the doctor was sent for. He administered emetics of sulphate of zinc, and ordered the patients to drink milk and linseed tea, of which they took several gallons. After this he adminstered castor oil. The family, nine in number, were fortunately restored to health. It was afterwards discovered that a jar, which had contained sheep-wash, had been rinsed, and put away with other jars of the same kind. This was the jar which had been used to contain the beer, and the arsenic, adhering to the sides of the jar, had been the cause of the mischief, which was proved by chemical analysis of some of the contents which remained.

THE SALE OF LAUDANUM BY CHEMISTS.

A correspondent has directed our attention to an inquest recently held at Cardiff, on the body of an unfortunate woman, who, having suffered for some time under a painful disorder, had contracted the habit of taking laudanum in large quantities. At the time of her death a bottle, labelled "Laudanum," was found under her bed, which led to the holding of an inquest ; but there was no evidence to support the suspicion that laudanum had occasioned her death. The Chemist from whom she had purchased it, deposed, that she had, for some time past, been in the habit of taking laudanum, sometimes to the extent of an ounce in the day, and that she could take as much as two ounces with impunity. The pain in her legs was so great, that it would have killed her, if she had not been kept alive by the soothing effects of the narcotic. He also observed that

some persons took laudanum even to a greater extent than the deceased, and that the Chemists in the town were in the habit of supplying it.

The coroner regretted that the law did not make it punishable for Chemists to supply laudanum indiscriminately in such appalling quantities. They ought to know, that the habit of taking laudanum to such an extent, must undermine the constitution, and the Chemists of the town should enter into a combination not to sell it. The jury entertained a similar opinion ; attributed the death to a certain disease, accelerated by large quantities of laudanum, and added to their verdict a censure on the Chemists for selling it.

Undoubtedly the Chemist has the opportunity of exerting considerable influence in checking the pernicious habit of taking opium or laudanum. This may be done by persuasion, and by representing, in strong terms, the fatal effects of the practice. To punish a Chemist for selling laudanum to a person accustomed to take it, would be making him responsible for the bad habits or the misfortunes of others, and depriving patients of that which is, in many cases, necessary. The habit of taking laudanum can only be overcome by degrees, and this is attended with not a little difficulty, the sufferings of the patients, when deprived of their usual dose, being very great. We have known the object attained by convincing the patient of the necessity of an effort on his part, and directing him to fill up the bottle with water after each dose has been taken out.

ALLEGED BREACH OF COVENANT IN THE SALE OF A BUSINESS.

STERRIKER *v.* MATTHEWS.

In our number for April, we published a few particulars of this case (page 488) in reference to which Mr. Matthews has sent a counter statement (too long for our space) to the following effect:—

Mr. Matthews states that he received nothing for the goodwill of his business, that he had refused £250, and afterwards his partner concluded the negociation, he believing at the time that £300 had been paid for goodwill. He subsequently discovered that the £300 was not for good-will, but in part payment on account of the valuation ! ! He further states that the sale only related to " the business of a Druggist," and recites some of the jokes which arose out of the cross-examination, when almonds, &c., &c., were enumerated among the articles sold; and he states that the agreement was prepared by Mr. Sterriker's attorney, according to his own instructions. We reported in our former article that *the law* was in favour of the defendant ; but we repeat that this case ought to serve as a warning to purchasers of businesses.

It is not sufficient in buying the business of a Druggist, to calculate the returns and the profits, but it is necessary to insert in the assignment a definition applicable to the business, such as it is, otherwise nothing but the pure drug business is conveyed, and the collateral trade, which in a country town may be a large portion, is reserved by the vendor, while the purchaser thinks he has bought the whole business as it stands.

REVIEWS.

The Use and Abuse of Alcoholic Liquors in Health and Disease, By William B. Carpenter, M.D., F.R.S., &c., &c. London : Charles Gilpin, 5, Bishopsgate Street Without ; John Churchill, Princes Street, Soho—Edinburgh: A. and C. Black—Dublin: J. H. Gilpin. 8vo, pp. 282.

In our number for July, 1848, we published the particulars of an offer by an advocate of temperance, of a prize of 100 guineas for the best essay on the above subject. The work before us is the one selected by Drs.

Forbes, Roupell and Guy, who were appointed by the donor to adjudicate the prize.

The subject is divided by the terms prescribed, into four distinct questions, of which the substance is as follows : 1st, What are the effects of alcoholic liquors on the healthy human system ; 2d, Should alcoholic liquors form part of the ordinary sustenance of man ? 3d, Are there any special conditions under which their use may be sanctioned or required ? 4th, Is their employment necessary in medical practice ?—and if so, in what cases, &c.

Our space would not admit of a detailed analysis of the facts collected, and the arguments advanced in support of the principles laid down by the author ; we must therefore be content to give a brief abstract of the result of the enquiry.

An exposure of the extensive and serious evils arising from intemperance, being a primary object of the work, and the author being himself a water-drinker, it might be expected that the bias would be unfavourable to the use of alcoholic liquors, except under very limited circumstances ; and this is found to be the case. Dr. Carpenter takes three hops and a jump to the conclusion that the habitual use of alcoholic liquors, whether in poisonous, excessive, or moderate doses, tends to the same result, namely, a derangement of the healthy functions of the human frame.

He first describes the chemical effects of alcohol in a concentrated form on the animal tissues, which he illustrates by the experiment of injecting the web of a frog's foot. The corrugation of these tissues by the coagulation of albumen, and the interference with the solidifiability of fibrine, are justly stated as impediments to the vital functions. Secondly, He argues that the consequences of excessive doses frequently repeated are the same as those of a single poisonous dose. Thirdly, He applies the same principle to the habit of taking even a moderate allowance of alcoholic liquors, to which he attributes the morbid actions found among the most common disorders of persons advanced in life.

These three positions being granted (although in our opinion the third is by no means proved) the conclusion follows, that alcoholic liquors are struck off the list of wholesome and proper articles of diet. Admitting the full force of every argument that can be adduced in condemnation of excess or intemperance, we cannot believe that the sweeping prohibition of fermented liquors to all persons in ordinary health, is calculated to promote the object. On the contrary, we think that the attempt to prove too much, often involves the whole question in doubt, and provokes a smile, instead of producing a convert. It may suit Dr. Carpenter and his frog to drink nothing but water. Savages to whom alcohol is unknown, may enjoy robust health without any other stimulus than the fresh air and wholesome exercise in which they live. Cannibals who eat each other, require neither beer nor wine to sharpen their appetites and invigorate their constitutions. But it does not follow in an artificial state of society, in a confined atmosphere, amidst the toils and anxieties of business, that an artificial stimulus is not required in many cases, either habitually or *pro re natâ*.

Dr. Carpenter does admit of a few exceptions. In cases of extreme (and improper) fatigue, or excessive privation, he attributes some benefit to the moderate use of alcoholic beverages ; but even under these circumstances he contends that the reaction almost neutralises the advantage, and leaves the reader to infer that the prejudicial results generally preponderate. As medicinal agents, a larger latitude is given, but not to the extent usually granted. Where great prostration exists, in fevers, and other debilitating disorders, the occasional advantage of wine, spirit, or malt liquor is admitted, but in the ordinary run of chronic disorders, in which these stimulants are usually resorted to, the doctor recommends a

different line of treatment. "The patient should be induced to give himself a complete holiday, to betake himself to some agreeable spot where there is sufficient to interest, but nothing to excite, to inhale the fresh invigorating breezes of a mountainous country * * *." We need not proceed any further. Such advice to a mechanic, a small tradesman with a large family, a clerk, or assistant in a house of business, or even to the wealthy merchant who is tied to the counting-house, carries with it an obvious reply, and passes the boundary between the sublime and the ridiculous. That this advice is good when practicable, no one will deny; that hydopathy—which is recommended by our author—has occasionally produced salutary effects is equally substantiated by facts; but the proposal to substitute a mountain or a damp sheet for a glass of wine or beer, indiscriminately in the case of persons of all conditions, and under all circumstances, is, we think, the result of a narrow mode of viewing a broad question.

There are many persons in whom intemperance is an infirmity—a disease. There are those who are incapable of moderation, whose motto is, "drink deep, or taste not." Such persons, like other monomaniacs, should be placed under proper restraint. To such persons a workhouse or an asylum would be more appropriate than a mountain or a wet sheet. There are others who are exposed to temptation, suffering under the privation of poverty, uneducated, reckless, and without sound principles to guide them. Total abstinence is to these persons desirable, if not necessary, as a protection against the dangers which they have not judgment or discretion to withstand. These are extreme cases, and unfortunately they are numerous among the working population; and for such cases a special system may be desirable. This, however, does not imply a general denouncement of fermented liquors as moral and physical poisons. The first miracle on record performed by the author of our religion was the conversion of water into wine, at a marriage feast. We think this fact is inconsistent with the supposition that the use of fermented liquors is in itself an abuse, and that such beverages were not intended by Providence for dietetic purposes.

In the work before us, the chemical and physical properties of these agents, in reference to the functions of respiration and nutrition, should have been explained on scientific principles. But this part of the subject is left by the author where he found it.

A Manual of Elementary Chemistry, Theoretical and Practical. By George Fownes, F.R.S. Third Edition. Revised by H. Bence Jones, M.D. Small 8vo, pp. 605. London: John Churchill.

A Practical Hand-Book of Medical Chemistry. By John E. Bowman. Small 8vo, pp. 258. London: John Churchill.

Elementary Researches in Electricity (Twenty-third Series): *On the Polar or other Condition of Diamagnetic Bodies.* By M. Faraday, D.C.L., F.R.S. (From the *Phil. Trans.*, pp. 16.)

A Universal Formulary, *containing the Methods of Preparing and Administering Officinal and other Medicines; the whole adapted to Physicians and Pharmaceutists.* By R. E. Griffith, M.D. 8vo, pp. 567. Philadelphia: Lea and Blanchard.

Annual Report of the Commissioner of Patents for the Year 1848. pp. 1143. Washington: Wendell and Van Benthuysen, 1849.

Our notice of Mr. Walker's Electric Telegraph Manipulation, is unavoidably postponed until next month.

OBITUARY.

On Wednesday, May the 8th, the decease of the justly celebrated and respected Chemist, Gay Lussac, took place, at Paris.

TO CORRESPONDENTS.

H.S. (Spilsby).—The wire must be insulated.

A Constant Reader (Windsor).—(1.) We believe watchmakers use elaine, the fluid portion of oil from which the stearine or margarine has been separated. This may be obtained by reducing the oil to a very low temperature and pressing.—(2.) Bebeerine is an organic base from Bebeeru or Greenheart. It is a tonic. See vol. v., page 228.

G. T. (a Registered Apprentice, Carlisle).—Sulphate of bebeerine, see vol. v., page 228. Sulphate of manganese is a mild aperient in doses of 3ss. to 3j. or more.

A Member.—(1.) We cannot furnish a formula for a worm lozenge.—(2.) Tincture of sulphur, or spiritus vini sulphuratus is a homœopatic preparation.

J. W. B.—(1.) Rose petals are pickled with common salt.—(2.) Elder flowers ditto.—(3.) Dried rose petals and elder flowers will not answer for distilling the waters.

M. P. S. (17th May).—The corn plasters and the other preparation alluded to do not require a stamp.

J. B. (Manchester).—A full answer to the question would occupy a page or two; we, therefore, referred our Correspondent last month to articles containing all the information. If he cannot comprehend what is there stated it would be useless to repeat it.

J. B. N. and *H. P.* (Richmond).—The questions would have been answered by post if the name had been given.

M. (Ruthin).—(1.) Red colour for show-bottles: decoction of cochineal with a little dilute sulphuric acid.—(2.) Carbonate of barytes is sometimes used for poisoning rats. It requires care, but is less dangerous than arsenic.

Extract from a New York Circular and Price List.—"Essential Oils: Should any one think our oils dear, they have only to send us word the price they are willing to pay, and they can be accommodated; but those who want pure articles must pay our market price, unless fluctuations in the market carry them higher or lower; and when that is the case, they can be returned at our expense, if they do not please."

Pharmacien.—The dinoxalate of quina, which we presume is the salt alluded to, is made according to Mr. Donovan by the direct combination of 55 grains of crystallized oxalic acid and 283 grains of quina.

J. H. K. D.—(1.) By treating iodine or bromine with chlorine gas.—(2.) From 50 to 100 cells should be used.—(3.) Dumas's work is out of print. Second-hand copies sometimes fetch twice or three times the original price.—(4.) At the second-hand book stalls.

Minimus.—(1.) The mouth of the bottle should not be closed while the action is going on.—(2.) Yes.—(3.) We believe peat charcoal is sold in London; but we do not recollect where.—(4.) Hydrosulphuric acid is sulphuretted hydrogen (H S).

A Country Druggist.—At Knight's, Foster Lane.

W. W. B. wishes to elicit information as to the best method of destroying the vinegar eel without injuring the vinegar for the use of the calico printer. He says oil of vitriol cannot be used.

J. H.—Nicol's prisms are very like the sketch sent. If they polarize the light, without giving two images, they will, no doubt, answer the purpose.

Argentum.—Galena.

H. B.—(1.) We do not undertake to analyse minerals for our correspondents, and in the present case could not answer the question without.—(2.) Yes.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the EDITOR, 338, Oxford Street, before the 20th of the month (if Answers be desired in the ensuing number).

INDEX.

PAGE

Abatement of Nuisances 158
Abraham, Mr., Apparatus for Distilled Water 170
Accident with Sweet Spirit of Nitre 247
Acetate of Lead, Use of, in the Manufacture of Sugar..... 334, 390
Acetone, Test for distinguishing from Pyroxilic Spirit 455
Acid, Arsenious, Action of, upon Albumen (Mr. J. B. Edwards) 524
——————— Combination of, with Albumen (Mr. Kendall) 526
——————— ditto (J. Danson) ... 307
—— Carbolic, and Creosote (Dr. Von Gorup-Besanez) 392
—— Carbonic, Exhalation of, in Health and Disease (MM. Hervier and St. Lager) 84
—— Nitric, Action of, on Rhubarb, and Production of a New colouring Matter, Erythrosin (M. Garot) 528
——— Anhydrous (M. Deville) 36
——— Action of, on Iodide of Potassium (Dr. Vogel, Jun.) ... 391
—— Sulphuric, Concentration of, in Cast-iron Pots (Mr. Roder) 390
—— Tartaric, and Sugar, Relations existing between (M. Bouchardat) 72
Acids, Hydrobronic and Hydriodic, Preparation of (C. H. Méne) ... 80
Action of Arsenious Acid upon Albumen (Mr. J. B. Edwards) 524
——— Light on Prussian Blue, exposed in a Vacuum (M. Chevreuf) 236
——— Medicines, Specific (Dr. Inman) 459
—— Nitric Acid on Iodide of Potassium (Dr. Vogel, Jun.)... 391
——— Nitric Acid on Rhubarb, and Production of a New colouring Matter, Erythrosin (M. Garot)..... 528
——— Sugar and Sulphuric Acid on Organic Substances (Dr. M. A. Schultze) 423
Active and Passive Oxygen (Dr. A. Buchner) 532
Acts, Medicine Stamp... 118, 251, 298
Adulterated Muriate of Morphia (J. F. Macfarlan and Co.) 337
Adulteration of Chemicals 346
——————— Drugs 147, 278
——————— Isinglass (T. Redwood) 503

PAGE

Adulteration of Milk 588
——————— Morphia, Alleged 549
——————— Muriate of Morphia, Letter on (Mr. Morson) 338, 361
——————— Quinoidin 84
——————— Salts of Morphia, Correspondence relating to 483
——————— Tobacco with Liquorice 241
——————— White Precipitate (H. Bayly) 339
——————— (J. B. Barnes)... 240
——————— (T. Bolton) 280
——————— Isinglass 549, 565
———————and Impurities of Chemical Preparations (Dr. Brett) 562
———————the Volatile Oils (G. H. Zeller) 575
Albumen, Action of Arsenious Acid upon (Mr. J. B. Edwards) 524
——— Combination of Arsenious Acid with (Mr. Kendall)...307, 526
Alcohate and Nitrates of Magnesia (A. Chodnew) 439
Alcohol, Congelation of 236
——— Test of the Purity of Castor and Croton Oils (Dr. Pereira) 499
——— and Water, Mixtures of, Relative Expansions of (G. H. Makins) 181
Allchin, Mr. Alfred, on the variable Strength of Tincture of Opium..... 454
Alleged Breach of Covenant in the Sale of a Business..... 591
——— Use of Chloroform 585
——— Employment of Chloroform by Thieves (John Snow, M.D.) 535
——— Prescription of Sir J. Clark's for Cholera 151
——— Adulteration of Morphia 549
Alum in Bread, Detection of 200
——— Plumose, Production of (Robert Christison) 14
Alumina, Tannate of, Spurious... 406
Aluminous Water, Analysis of (Mr. Thomas Beesley) 452
Amalgams for Stopping Teeth (Mr. Arnold Rogers) 402
Amber Varnish, Sterling's Process of making 137
Amidulin, a Modification of Starch (Fr. Schulze)..... 142
Amomum Citratum, a Species of large Cardamom (Dr. Pereira) 313

PAGE

Analyses, Microscopical, of the Dust of the Regular Winds, and of Blood Rain (Dr. C. G. Ehrenberg) 569
——— of Trisnitrate of Bismuth (Mr. Edwards) 461
Analysis of an Aluminous Water (Mr. Thomas Beesley).. 452
——— of the Barks of the Rhamnus Frangula and R. Cathartica (M. Binswanger) 537
——— of the Seeds of the White Poppy (Sacc)..... 543
——— of the Well-water at the Royal Mint (W. T. Brande) ... 383
Andrews, Mr. H. C., on the Fumigation of Wheat with Sulphur 239
Anhydrous Nitric Acid (M. Deville) 36
Animal Charcoal as an Antidote (B. Howard Rand) 78
——— and Vegetable Kingdoms, Relations between (R. Warington)..... 521
Animalcules found in Water 281
Anniversary of the Pharmaceutical Society 493, 553
Antidote, Animal Charcoal as (B. Howard Rand) 78
Apothecaries' Company and Board of Health, Case of difficulty between 194
——————— Liverpool 104
Apothecary, proper Business of... 1
Apparatus for Distilling Water (Mr. Abraham)..... 170
——————— for the Preparation of Tinctures (Mr. S. Gale) 459
Approaching Anniversary of the Pharmaceutical Society 493
Aristolochia Clematitis (F. L. Winckler) 543
Arnica, Tincture of 548
Arsenic, a Family nearly poisoned by..... 285
——— Death from the Fumes of 238
——— Employed Medicinally by the Chinese 277
——— Lecture on, Dr. Brett's 304, 305
——— Poisoning by..... 284
——— Proposed Restrictions on the Sale of (J. Tunstall, M.D.) 175
Arsenious Acid, Action of, upon Albumen (Mr. J. B. Edwards) 524
——————— Combination of, with Albumen (Mr. Kendall)... 526
——————— ditto (J. Danson) 307
Art, Works of, Exhibition of..... 190
Artesian Well on Islington Green 389
Asclepion (C. List) 139

PAGE

Ashby, Mr. C. E., on the Preservation of Leeches 34
Associate, Letter from 39
Association, Chemists', Bristol 63, 256
——————— Liverpool 7, 65, 120, 210, 259, 304, 406, 459, 497, 562
——— for the Advancement of Science, British..... 118, 189
——— Pharmaceutical, Bristol 360
Associations, Pharmaceutical, Provincial..... 250
Atomic Weight of Lanthanium and Didym (M. C. Marignac)... 392
Atropine (Dr. Bouchardet and Stuart Cooper) 232
Attree, W. H., on the Weather and the Leech 85
Attwood and Renton's Patent for Improvements in the Manufacture of Starch 539
Ava Root of the Sandwich Islands (W. Hamilton, M. D.)..... 218
Aventurina like Porcelain Glaze (A. Wachter) 80

Bakerian Lecture by Prof. Graham, Abstract of 379
Balsam Trees from Scinde (J. Ellerton Stocks, M.D.) 270
Baly, H., on Adulteration of White Precipitate 339
Barber, T. A., on Ferri et Quina Citras 338
Bark, Calisaya (M. H. A. Weddell) 428
—— Cinchona, Residual, Employment of, in the Manufacture of Sulphate of Quinine (Schlottfeldt) 542
—— Copalchi, Notice of (James Stark)..... 463
Barks, Cinchona (M. Weddell) ... 267
——————— Table of 240
——— of the Rhamnus Frangula and Cathartica, Analysis of (Binswanger)..... 537
Barnes, Mr. J. B., on Adulteration of White Precipitate..... 240
——————— on Spurious Ferri Citras cum Quina 279
Bartlett, Mr. W., on an improved Process for making Lead Plaster 457
Batka, J. B., on the Plants from which Senna Leaves are obtained 25
Battles of the Water Companies 399
Bebeerine 594
Bees' Wax (Dr. Vogel, Jun.) 135
Beesley, Mr. Thomas, Analysis of an Aluminous Water 452

PAGE
Beesley, Mr., on Oxychloride of Calcium 568
Belgian sorts of White Lead 542
Belladonna Juice, Decomposition of (Mr. H. S. Evans) 260
Berkeley, Rev. M. J., on the larger Cells observed in Cholera Evacuations 329
Berzelius, Laboratory of 187
Bill, Medical 49, 97
Binswanger, M., Analysis of the Barks of the Rhamnus Frangula and R. Cathartica..... 537
Birkenhead Chemical and Philosophical Society 462
Birmingham Pharmaceutical Institution 254
Bismuth, Trisnitrate of, Analysis of (Mr. Edwards)..... 461
Bitter Matter of Ripe Buckthorn Berries (Dr. F. L. Winckler) ... 542
Blacking, Liquid 393
——— Paste 393
Bley and Diesel on Senna Leaves 141
Blood, Detection of Chloroform in (Ragsky)..... 37
Blowpipe Reactions of Strontia, Baryta, &c. (Sheridan Muspratt) 259
Blue Fire 343
Board of Health and Apothecaries' Company, Case of Difficulty between 194
——————— and the Churchyards 201
——————— and the Parish Authorities 155
Bok-Shung, or Chinese Rice Paper 545
Bolton, Thomas, on Adulteration of White Precipitate 280
Bonjean, M., on Glairine..... 69
——- ——— Glairidine 71
Bootle Water, some Remarks on (Dr. Sheridan Muspratt)..... 564
Borax, Reaction of, on Tincture of Turmeric (Dr. Vogel, Jun.) ... 441
Botanical and Pharmaceutical Desiderata 285, 334, 585
——— Society of London... 87, 195
Bouchardat, M., on the Vanilla of the Island of Bourbon 275
Bouchardet, Dr., on Atropine..... 232
——————— on the Relations existing between Sugar and Tartaric Acid 72
Boutigny, M., on the Momentary Incombustibility of Living Organic Tissues..... 376
——— on the Spheroidal State of Bodies 75
Brande, W. T., Analysis of the Well-Water at the Royal Mint 383
PAGE
Brass Lacquer 296
Breach of Covenant on the Sale of a Business 488
Brett, Dr., Lecture on Arsenic, 304, 305
——————— on Toxicology 168
Brieger, on Unguentum Potassii Iodidi 543
Bristol Chemists' Association...63, 256
———Pharmaceutical Association 360
British Association for the Advancement of Science.....118, 189
Buchner, Dr. A., on Passive and Active Oxygen 532
Buckthorn Berries, Bitter Matter in (Dr. F. L. Winckler) 542
Business, Breach of Covenant on the Sale of 488
——— Chemists' Mode of Valuing (B. Humpage) 186
Cake Litmus, colouring Matter of, Dr. Pereira..... 12
Calcium, Oxychloride of (Mr. Beesley) 568
California in Ireland..... 120
Calisaya Bark (M. Weddell) 428
Camphorated Chloroform 343
Cantharides, Mylabris Cichorii, a Substitute for..... 239
Cantharidin and its Pharmaceutical Preparations (Dr. Oettinger) 437
Capsicum, Concentrated Tincture of (Dr. Turnbull) 362
Capsules, Train Oil 279
Carbon, Chloride of, a Solvent for Caoutchouc, &c. 334
Carbolic Acid and Creosote (Dr. Von Gorup Besanez) 392
Carbonate of Lime as an Ingredient of Sea-water (John Davy, M.D.) 178
——— ——— Sesquioxide of Iron (Mr. Danson)..... 260
Carbonic Acid, Exhalation of, in Health and Disease (MM. Hervier and St. Lager) 84
Carburetted Hydrogen Gas, improved Process for obtaining (M. F. J. De Cavaillon) 441
Cardamom, large, an undescribed Species of (Dr. Pereira) 313
Case of Difficulty between the Apothecaries' Company and the Board of Health 194
Casein, Employment of, as an Envelope for Medicines (G. Jozean) 282
Castor and Croton Oils, Alcohol Test for the Purity of (Dr. Pereira) 499
Cavaillon, M. F. J. De, on an improved Process for obtaining Carburetted Hydrogen Gas..... 441

PAGE

Cell, Galvanic, Construction of, without Zinc (Dr. H. Reinsch) 533
Cement, Hydraulic 38
——— Marine 343
Cephaelis Ipecacuanha (M. Weddell) 332
Chalk, Composition of (Wittstein) 278
——— Strata, Formation of Flints in..... 238
Chandois Achille, on colouring Matter from Orchil 284
Charcoal, Animal, as an Antidote (B. Howard Rand) 78
——— Peat, Uses and Properties of, as a Disinfectant (Jasper W. Rogers) 87, 195
Charge of Manslaughter at Maryport 99
Cheap Printers' Ink from Rosin Oil 586
Chemical and Philosophical Society, Birkenhead 462
——— Society 489
——— Preparations, Impurities and Adulterations of (Dr. Brett) 562
Chemicals, Adulteration of... 346
——— and Drugs, Exhibition of..... 191
Chemist, Pharmaceutical, Professional Character of 345
Chemists' Association, Bristol 63, 256
——— ——— Liverpool 7, 65, 120, 259, 304, 406, 459, 497, 562
——— Business, Mode of Estimating the Value of..... 109
——— ——— Mode of Valuing (B. Humpage) 186
——— at Liverpool, Meeting of 40
——— Sale of Laudanum by ... 590
Chevalier, M., on Oxide of Zinc as a Pigment 530
——— on Vessels coated with Vitrified Enamel 277
Chevreul, M., on the Action of Light on Prussian Blue exposed in a Vacuum 236
Chinese, Arsenic employed Medicinally by 277
——— Rice Paper, or Bok-Shung 545
Chloride of Carbon, a Solvent for Caoutchouc, &c..... 334
Chloroform, Alleged Employment of, by Thieves (John Snow, M.D.) 535
——— in the Blood, Detection of (Ragsky) 37
——— Insanity from 394
——— Robbery by means of 393
——— Notes on the Purification and Properties of (W. Gregory) 580

PAGE

Chloroform, alleged Use of 585
——— Test for..... 584
Chodnew, A., on the Alcohate and Nitrates of Magnesia 439
Cholera, the 53, 111, 151
——— Alleged Prescription of Sir James Clark for 151
——— Diagram, showing the Deaths from 482
——— Evacuations, larger Cells observed in (Rev. M. J. Berkeley) 329
——— Fungus Hypothesis of 265
——— Hypotheses of, the Cause of 223
——— Ozone, Hypothesis of 265
——— Treatment of 152
Chrome Ink, Runge's 588
Christison, Robert, M.D., on the Production of Plumose Alum ... 14
Churchyards and the Board of Health..... 201
Cinchona Bark, Residual, Employment of, in the Manufacture of Sulphate of Quinine (Schlottfeldt) 542
——— Barks, Commercial, Table of 240
——— ——— (M. Weddell) ... 267
——— Calisaya (M. Weddell) 224, 365
Cinchonas, Natural History of (M. Weddell) 224
Cinchonine in Sulphate of Quinine, Process for detecting (M. O. Henry) 320
Cinnamon Region of Eastern Africa (Mr. W. D. Cooley) 34
Clark, Sir J., Alleged Prescription of for Cholera 151
Cobb, Mr. John, on the colouring Matter in Tincture of Rhubarb 529
Cochineal, Prepared, for colouring Jellies, &c. 443
Cod-liver Oil, Solubility of Iodine in (Fleischmann) 541
Coffey's, Mr., Esculapian Still and Condensing Apparatus..... 351
Coffinism 97
Coleman, Mr. W. S., on Drying Specimens of Flowers 483
Collodium Cantharidale (F. Ilisch) 141
Colour, Red, for Paper Hangings 588
——— for Show Bottles 594
Colouring Matter from Orchil (Achille Chandois) 284
——— in Tincture of Rhubarb (Mr. John Cobb) 529
——— Matters of Dutch or Cake Litmus (Dr. Pereira, M.D.)..... 12
Combination of Arsenious Acid with Albumen (J. Danson)..... 307

PAGE
Combination of Arsenious Acid with Albumen (Mr. Kendall) ... 526
Commerchial Cinchona Barks, Table of 240
——— ——— Varieties of Ginger (Dr. Pereira) 212, 261
——— ——— ——— ——— of Turmeric (Dr. Pereira)..... 309
Composition of Chalk (Wittstein) 278
——— ——— Honey (M. Soubeiran) 74
——— ——— Lake and Well-waters 473
——— ——— ——— Lime Water (Wittstein) 37
——— ——— ——— for Lubricating Machinery 333
——— ——— ——— of Marble (Wittstein) 278
——— ——— ——— River and Well-waters..... 472
——— ——— ——— Thames Water... 471
——— ——— ——— for Tinning and Zincing 143
——— ——— ——— of the Titanium Crystals met with in Blast Furnaces (Prof. Wöhler) 315
——— ——— ——— the Water supplied by the Hampstead Water Works Company (Mr. J. Mitchell) 389
——— ——— ——— Sheep-dipping, poisoning by 590
Compounds, Protein 188
Concentrated Tincture of Capsicum (Dr. Turnbull) 362
Concentration of Sulphuric Acid in Cast-iron Pots (Mr. Roder) 390
Condensing Apparatus (Mr. Coffey's) 351
Congelation of Alcohol..... 236
Construction of a Galvanic Cell without Zinc (Dr. H. Reinsch) 533
Conversazione 349, 551
Cooley, Mr. W. D., on the Cinnamon Region of Eastern Africa 34
Cooper, Dr. Stuart, on Atropine 232
Copaiva, Oil of (C.G. Mitscherlich) 233
Copalchi Bark, Notice of (James Stark)..... 463
Copper, Sulphate of, determination of Sugar by means of (H. Fehling) 419
Coquilla Nuts (Sir W. Hooker) ... 431
Corenwinder, M. B., on the Preparation of Nitrogen..... 132
Correspondence on the Sale of Poisons 352
——— ——— relating to Adulteration of Salts of Morphia ... 483

PAGE
Correspondents...47, 96, 144, 199, 247, 295, 343, 395, 443, 491, 547, 594
Cost of Gun-cotton 84
Cotton, Gun, Cost of 84
——— ———, and Xyloidin 38
Croton Oil, Test for 296
Crystals, Titanium, Composition of (Prof. Wöhler) 315

D'amba, or Dakka of Southern Africa (W. F. Daniell, M.D.)... 363
Daniell, W. F., on the D'amba, or Dakka of Southern Africa 363
Danson, Mr., on Carbonate of Sesquioxide of Iron 260
——— ——— on the Combination of Arsenious Acid with Albumen 307
Darling, Mr., on the Pitch Lake of Trinidad..... 18
Davy, John, M.D., on Carbonate of Lime as an ingredient of Seawater 178
Daylight Druggist 166
Deafness, Glycerine an Application for 32
Death from the Fumes of Arsenic 238
———of Gay Lussac 593
Decomposition of Belladonna Juice (Mr. H. S. Evans) 260
Deïamba, or Tobacco of Congo ... 143
Detection of Alum in Bread 200
——— ——— of Chloroform in the Blood (Ragsky)..... 37
Determination of Sugar by Means of Sulphate of Copper (H. Fehling) 419
Deville, M., on Anhydrous Nitric Acid 36
Diagram showing the Deaths from Cholera 482
Diarrhœa, Portable Medicines for 175
Didym, Atomic Weight of (Mr. C. Marignac)..... 392
Diffusion of Liquids (Professor Graham)..... 379
Dilution of Ether (Mr. H. D. Pochin) 278
Dinner, Pharmaceutical School ...8, 56
Discovery of Poison in a Body after Eight Years' Interment ... 86
Disinfectants (Mr. Mercer)..... 460
Distilled Water, Apparatus for (Mr. Abraham)..... 170
Distribution of Prizes 203
Drinking Water, Purification of . 474
Druggist, Daylight 166
Drugs, Adulterated, Law relating to the Importation of (M. J. Bailey) 147
——— Adulteration of..... 147, 278

PAGE

Drugs and Chemicals, Exhibition of 191
Drying Specimens of Flowers (Mr. W. S. Coleman) 483
Dutch, or Cake Litmus, colouring Matter of (Dr. Pereira) 12
Dye, a New Yellow (W. Stein) ... 541

East Indian Senna 401
——————— Dr. Royle ... 360
Edwards, Mr. John B., on the Action of Arsenious Acid upon Albumen 524
——— Analysis of Trisnitrate of Bismuth 461
Effects of the Organic Matter in Drinking Water 408
Ehrenberg, Dr. C. G., Microscopical Analysis of the Dust of the Regular Winds, and of Blood Rains 569
Elaine 199
Election of President and Vice-President 56
Electric Light 138
——— Mr. W. S. Ward . . 191
——————— Mr. J. Wilkinson... 68
——————— Experiments for Testing the Illuminating Power of (Dr. Letheby) 22
Elementary Organs of Plants (Mr. H. S. Evans) 497
Emplastrum Plumbi.....96, 144
Employment of Casein as an Envelope for Medicines (G. Jozeau) 282
——————— of Chloroform by Thieves (John Snow, M.D.) ... 535
Enamel, Vitrified, Vessels coated with (M. Chevallier)..... 277
——— White, for cementing Earthenware and Glass 588
Erythrosin, Production of (M. Garot)..... 528
Esculapian Still and Condensing Apparatus (Mr. Coffey's)..... 351
Estimation of Sugar of Milk (M. Poggiale) 72
Ether, Dilution of (Mr. Pochin) 278
Evans, Mr. H. S., on Decomposition of Belladonna Juice 260
——————————on the Elementary Organs of Plants 497
Evening Lectures at the Pharmaceutical Society 254, 303
Examination, Questions for 203
Exhalation of Carbonic Acid in Health and Disease (by MM. Hervier and St. Lager) 84
Exhibition of Drugs and Chemicals 191

PAGE

Exhibition of Works of Art and Manufacture 190
——— of the Works of Industry of all Nations in 1851 339, 450, 549, 557
Experiments for Testing the Illuminating Power of the Electric Light (Dr. Letheby) 22
Explosion of Gun-Cotton, Injury by 487
Expressed Oil of Black and White Mustard Seeds (St. Darby)..... 81
Extract of Indian Hemp 443
——— from the Registrar-General's Return 481
——— of Taraxacum 48

Family Poisoning 86
Faraday, Prof., Lecture on the Electricity of the Air 442
Fehling, H., on the Determination of Sugar by Means of Sulphate of Copper 419
Ferment Oils 142
Fermented Pharmaceutical Preparations (Butler Lane, M.D.). 31
Fermentolia 142
Ferri Citras cum Quina, spurious (Mr. J. B. Barnes) 279
——— et Quinæ Citras (T. A. Barber) 338
Fever Tincture (Warburg's) 134
Fewtrell, Mr. W. T., on the Sale of Poisons 357
Fire, Blue 343
Fleischmann, Solubility of Iodine in Cod-liver Oil..... 541
Flints in Chalk Strata, Formation of 238
Flowers, Specimens of, Mode of Drying (Mr. W. S. Coleman)... 483
Formation of Flints in Chalk Strata 238
Formula for Hair Lotion..... 444
——— Incense 344, 444
Forchhammer, Prof., on Organic Matter in Water 281
Formulæ for the Preparation of Sealing Wax (F. X. Pottinger) 133
Frankland, Dr. E., Researches on the Organic Radicals 489
French Industry, Exposition of the Products of 127
Fumigation of Wheat with Sulphur (Mr. H. C. Andrews)..... 239
Fungus Hypothesis of Cholera ... 266

Gale, Mr. Samuel, Apparatus for the Preparation of Tinctures ... 459
Galvanic Cell, Construction of, without Zinc (Dr. H. Reinsch) 533

PAGE
Game, Poisoned 339
Garot, M., on the Action of Nitric Acid on Rhubarb, and Production of a New colouring Matter 528
Gas, Carburetted Hydrogen, improved Process for obtaining (M. F. J. De Cavaillon) 441
—— Water, or Hydro Carbon (Mr. Trumper) 210
—— Rosin, Preparation of 589
Gases, Lecture on (F. W. Griffin) 360
Gay Lussac, Death of 593
Glass and Earthenware, White Enamel for Cementing 588
Ginger, Commercial Varieties of (Dr. Pereira) 212, 261
Glairidine (M. Bonjean) 71
Glairine (M. Bonjean)..... 69
Glaze, Porcelain (A. Wachter) ... 80
Glycerine 32
———— as an Application in Cases of Deafness..... 32, 68
———— Letter on the Use of (Mr. Yearsley) 132
Gorup-Besanez, Dr. Von, on Carbolic Acid and Creosote 392
Graham, Prof., on the Diffusion of Liquids 379
Grant for Scientific Purposes, National 288
Grease Stains, Removal of 248, 295, 344
Green Ink.....492, 547
Gregory, W., M.D., Notes on the Purification and Properties of Chloroform..... 580
Griffin's, F. W., Lecture on the Gases, Report of 360
Guilliermond, M. A., on a Process for Estimating the Quality of Opium..... 236
Gum Arabic, Purification of (H. Picciotto) 16
Gun Cotton, Cost of 84
———— Injury by Explosion of 487
———— Silvering Glass by the Employment of 140
———— Spontaneous Decomposition in (Mr. T. H. Tustin) 405
———— Temperature at which it explodes 440
———— and Xyloidin..... 38
Gunpowder, New 534

Hair Lotion, Formula for..... 444
Hamilton, W., on the Ava Root of the Sandwich Islands 218
———— on the Purgative Properties of Oils obtained from Plants indigenous in the Antilles 129
Hanbury, Daniel, jun., on the Resin of the Norway Spruce Fir 400
PAGE
Hanbury, Daniel, jun., on Turnsole 308
Heat, Polarization of 138
Heating and Ventilating, Notes on 315
Heijningen, J. Van, on Quinoidin and β Quinine 322
Henry, M. O., on a Process for detecting Cinchonine in Sulphate of Quinine 320
Hepworth, Mr., Letter from 39
Hervier and St. Lager on the Exhalation of Carbonic Acid in Health and Disease 84
Hirschberg, André V., on the Purification of Honey 543
History of the Cinchonas, by M. Weddell 224
Homœopathic Doctor, Libel against 489
Homœopathy, Patronage of..... 495
Honey, Composition of, by Soubeiran 74
———- Purification of, by André V. Hirschberg 543
Hooker, Sir W., on the Jute; Corchorus Capsularis L..... 545
———— on Patchouli 282
———— on Piacaba and Coquilla Nuts..... 431
———— on the Vegetable Ivory Palm..... 369
Humpage, Mr., on the Mode of valuing a Chemist's Business... 186
Hydraulic Cement..... 38
Hydrobromic and Hydriodic Acids, Preparation of (C. H. Mène) ... 80
Hydro Carbon, or Water-Gas (Mr. Trumper) 210
Hypothesis of Cholera, Fungus ... 266
———— Ozone..... 265

Ilisch, or Collodium Cantharidale 141
Importation of Oxide of Zinc, duty free 533
Improved Process for manufacturing White Lead (Mr. J. E. D. Rodgers)..... 440
Improvements in the manufacture of Starch, Messrs. Attwood and Renton's Patent for 539
———— in the manufacture and refining of Sugar 220
Impurities and Adulteration of Chemical Preparations (Dr. Brett) 562
Incense, Formula for..... 344, 444
Incombustibility of living Organic Tissues (Boutigny) 376
———— ditto (Prof. Plucker) 433
Indian Hemp, Extract of..... 443
———— Tincture of 443
Indigo, Test of the Quality of (H. Reinsch)..... 234

PAGE

Injury by an Explosion of Gun-cotton 487
Ink, green 492, 547
—— Printer's, from Rosin Oil..... 586
—— red 343
—— Runge's Chrome 588
—— Stains, removal of 295
Inks for Writing on Tin-plate and Sheet Zinc 280
Inman, Dr., on the specific action of Medicines 459
Inquests, frequency of 189
Insanity from Chloroform 394
Institution, Pharmaceutical, Birmingham..... 254
Intramural Interment 446
Iodide of Potassium, Action of Nitric Acid on (Dr. Vogel, Jun.) 391
Iodine in Cod-liver Oil, Solubility of (Fleïschmann) 541
——— Starch used as a Test for minute Quantities of (M. L. Thorel) 283
Iridescent Paper (A. Wagner) ... 544
Iron, Carbonate of Sesquioxide of (Mr. Danson)..... 260
—— Protosulphate, Solution of, Change which it undergoes in the Air (Wittstein) 38
Isinglass, Adulteration of (T. Redwood) 503
Isinglass, Adulteration of 549, 565
Jozeau, G., on Casein as an Envelope for Medicines 282
Juice, Belladonna, decomposition of (Mr. H. S. Evans) 260
Jute ; Corchorus Capsularis, L. (Sir W. J. Hooker) 545

Kendall, Mr., on the Combination of Arsenious Acid with Albumen 526

Laboratory of Berzelius 187
Lacquer, Brass 296
Lake, Pitch, of Trinidad, Account of (Mr. Darling) 18
Landerer, Dr. X., on Salep 435
Lane, Butler, M.D., on fermented Pharmaceutical Preparations ... 31
———— on Medicinal Wines 171, 215
Laudanum, Sale of, by Chemists... 590
Lanthanium and Didym, Atomic weight of (M. C. Marignac) ... 392
Larger Cells observed in Cholera Evacuations (Rev. M. J. Berkeley) 329
Lays of the Laboratory 292
Lead, Acetate of, use of, in the manufacture and refining of Sugar 334, 590

PAGE

Lead, Oxychloride of, for white Paint 390
—— Plaster, improved Process for making (Mr. W. Bartlett) 457
—— and Silver in Sea-water, presence of (MM. Malaguti, Durocher, and Sarseau) 522
—— Sulphate of, Toxicological Properties of 434
—— White, Belgian sorts of 542
Leather, varnished, manufacture of in France..... 333
Leaves, Senna (F. L. Bley and E. Diesel) 141
Lecture, Bakerian (Prof. Graham) 379
——— on the Electricity of the Air (Prof. Faraday)..... 442
——— on the Gases (F.W. Griffin) 360
——— on the Impurities and Adulteration of Chemical Preparations (Dr. Brett) 562
——— on Toxicology (Dr. Brett) 168
Lectures on Arsenic (Dr. Brett)... 304
———— Evening, at the Pharmaceutical Society..... 254, 303
Leech, the, and the Weather (W. H. Attree, Esq.) 85
Leeches, Preservation of (Mr. C. E. Ashby) 34
Legislation, Pharmaceutical 558
Letheby, Dr., on Experiments made for testing the Illuminating Power of the Electric Light..... 22
Letter from an Associate 39
——— on the Adulteration of Muriate of Morphia (T. N. R. Morson) 361
——— on the Substitution of one Medicine for another 176
Libel against a Homœopathic Doctor..... 489
License, Patent Medicine..... 118
Light, Electric 138
———————— Experiments for testing the Illuminating Power of 22
————————(Mr. J. Wilkinson) 68
————————(Mr. W. S. Ward) 191
Lime, Carbonate of, an Ingredient of Sea-water (John Davy, M.D.) 178
—— Superphosphate of..... 492
—— Water, Composition of (Wittstein) 37
Liniment, White 47
Linnæan Society, New President of 289
Liquid Blacking..... 393
Liquids, Diffusion of (Professor Graham) 379
Liquor Sennæ Aromaticus 524
——— Taraxaci 343
Liquorice, alleged Adulteration of Tobacco with..... 241

PAGE
List, C., on Asclepian 139
—— of Members, Associates, &c. 20, 119, 359, 496
Litmus, Dutch or Cake, colouring Matter of (Dr. Pereira) 12
Liverpool Chemists' Association 7, 65, 120, 210, 259, 304, 406, 459, 497, 562
———— Apothecaries' Company.. 104
———— Pharmaceutical Meeting 66
Lubricating Machinery, Composition for 333
Lunar Caustic with a Metallic Nucleus 392

Macfarlan & Co. on Adulterated Muriate of Morphia 337
Magnesia, Nitrates and Alcohates of (A. Chodnew) 439
Makins, G. H., on the Relative Expansion of Mixtures of Alcohol and Water 181
Malaguti, Durocher, and Sarseau on the presence of Lead and Silver in Sea-water 522
Manna, production of (Mr. J. Stettner) 283
Mannite 458
Manufacture and Refining of Sugar, Improvements in 220
———— of Orchil and Cudbear 588
———— of Starch, Improvements in 539
———— of Sulphate of Quinine, Use of Residual Cinchona Bark in (Schlottfeldt) 542
———— of Varnished Leather in France 333
———— and Works of Art, Exhibition of 190
Marble, Composition of (Wittstein) 278
Marignac, M. C., on the Atomic Weight of Lantharium and Didym 392
Marine Cement 343
Maumené, M., on a new Re-agent for Detecting the Presence of Sugar in certain Liquids 587
Medical Bill 49, 97
——— Charities 493
——— Reform 1, 397
Medicinal Wines (Butler Lane, M.D.) 171, 215
Medicine, Patent, Licence 118
———— Stamp Acts ... 118, 298, 251
———— Substitution of one for another 101
———— Letter on (T. Pryer) ... 176
Medicines, employment of Casein as an Envelope for (G. Jozeau) 282
———— Quack, mode of Puffing 163
———————— Property in 487

PAGE
Medicines. Specific action of (Dr. Inman) 459
———————— Portable, for Diarrhœa 175
Meeting, Pharmaceutical, 9, 203, 400, 452
———————— Liverpool, 40, 66, 168
Members and Associates, List of, 20, 119, 359, 496
Mène, C. H., on the preparation of Hydrobromic and Hydriodic Acids 80
Mercer, Mr., on Disinfectants..... 460
Metallic Salts, new Method of Analysing (M. Rouchet) 233
———— Silver, Method for determining the Purity of 47
Method of detecting the Presence of Strychnia (Mr. Lewis Thompson) 24
———— for determining the Purity of Metallic Silver 47
Metropolitan Commission of Sewers, Rottenness in 116
———————— Court of Sewers ... 116
Microscopical Analysis of the Dust of the Regular Winds, and of Blood Rain (Dr. C. G. Ehrenberg) 569
Milk or Cream, to Preserve..... 186
—— Sugar of, estimation of (M. Poggiale)..... 72
—— adulteration of 588
Miranda, J. G., on the Use of Acetate of Lead in the Manufacture of Sugar 390
Mitchell, Mr. J., on the Water supplied by the Hampstead Water-works Company 389
Mitscherlich, C. G., on Oil of Copaiva 233
Mixtures of Alcohol and Water, relative Expansions of (G. H. Makins) 181
Mode of estimating the Value of a Chemist's Business 109
——— puffing Quack Medicines... 163
——— silvering Glass by the Employment of Gun-cotton 140
——— Valuing a Chemist's Business (B. Humpage) 186
Momentary Incombustibility of living Organic Tissues (Boutigny)..... 376
———————— ditto (Prof. Plucker) 433
Morphia, Muriate of, Adulterated, Letter on, by Mr. Morson 361
———— ditto (Messrs. Macfarlan) 337
———— Salts of, Correspondence relating to the Adulteration of 483
———— Alleged Adulteration of 549

PAGE
Morson, T. N. R., Letter on Adulteration of Muriate of Morphia 361
Moss, Peat, Uses and Properties of (Jasper W. Rogers).....87, 195
Muriatic Acid, poisoning by 284
Murray's Specific for the Gout ... 291
Muspratt, Dr. Sheridan, on the Blowpipe Re-actions of Strontia, Baryta, &c. 259
——————————— Remarks on the Bootle Water..... 564
Mustard Seeds, expressed Oil of (St. Darby) 81
Mylabris Cichorii, a Substitute for Cantharides 239

National Grant for Scientific Purposes 288
Natural History of the Cinchonas (M. Weddell)..... 224
Nature and Effects of the Organic Matter in Drinking-water 408
New Gunpowder 534
New Method of Analysing Metallic Salts (M. Rouchet) 233
—— President of the Linnæan Society 289
New Re-agent for Detecting the Presence of Sugar in certain Liquids, (M. Maumené) 587
Ninth Anniversary of the Pharmaceutical Society..... 553
Nitrates and Alcohate of Magnesia (A. Chodnew) 439
Nitrate of Silver Stains, removal of 248
Nitre, sweet Spirit of, Accident with..... 247
Nitric Acid, Action of, on Iodide of Potassium (Dr. Vogel, jun.) ... 391
———————Action of, on Rhubarb, and Production of a New colouring Matter, Erythrosin (M. Garot)..... 528
———————— Anhydrous (M. Deville) 36
Nitrogen, Preparation of (M. B. Corenwinder)..... 132
Norway Spruce Fir, Resin of (Mr. Daniel Hanbury, Jun.) ... 400
Notes on Heating and Ventilating 315
——— on the Purification and Properties of Chloroform (W. Gregory) 580
Notice of the Copalchi Bark (James Stark) 463
Notices of Books, see *Reviews*
Nuisance, Trial respecting, Jewell *v.* Etwall and another 485
Nuisances, Abatement of..... 158
——————— Removal of..... 445

PAGE
Nuts, Piacaba and Coquilla (Sir W. Hooker) 431

Obituary of Dr. Anthony Todd Thomson 90
Oettinger, Dr., on Cantharidin and its Pharmaceutical Preparations 437
Oil of Anda, Purgative Properties of (Alexander Ure) 9
—— Cod-liver, Solubility of Iodine in (Fleischmann) 541
——of Copaiba (C.G. Mitscherlich) 233
——— White and Black Mustard Seeds, expressed (St. Darby) ... 81
——of Peppermint (B. Sandrock) 580
——Rosin, Preparation of 589
Oils, Castor and Croton, Alcohol Test of the Purity of (Dr. Pereira) 499
—— Ferment..... 142
—— obtained from Plants indigenous in the Antilles (W. Hammilton) 129
—— Volatile, Tests of the Purity and Adulteration of (G. H. Zeller) 575
Oleum Hyoscyami Infusum (Overbeck) 541
Opium, Process for estimating the Quality of (M. A. Guilliermond) 236
——— Tincture of, variable strength of (Mr. Alfred Allchin) 454
Orchil, colouring Matter from (Achille Chaudois) 284
—— and Cudbear, Manufacture of 588
Organic Matter in Drinking-water, Nature and Effects of 408
——————————— Water (Prof. Forchhammer..... 281
———— Radicals, Researches on (Dr. E. Frankland) 489
——— Substances, Action of Sugar and Sulphuric Acid on (Dr. M. A. Schultze) 423
——— Tissues, living, Momentary Incombustibility of (M. Boutigny) 376
——————— Momentary Incombustibility of (Prof. Plucker) 433
Overbeck on Oleum Hyoscyami Infusum 541
Oxide of Zinc as a Pigment (M. Chevalier) 530
——————Importation of, duty free 532
Oxychloride of Lead for White Paint 390
Oxychloride of Calcium (Mr. Beesley) 568
Oxygen, passive and active (Dr. A. Buchner) 532
Ozone Hypothesis of Cholera 265

PAGE
Paint, White, Oxychloride of Lead for 390
Palm, Vegetable Ivory, some Account of (Sir W. Hooker)..... 369
Paper, Iridescent (A. Wagner) ... 544
——— Rice, Chinese 545
Paper Hangings, Red colour for ... 588
Parish Authorities and the Board of Health..... 157
Passive and active Oxygen (Dr. A. Buchner) 532
Paste Blacking 393
Patchouli (Sir W. J. Hooker) ... 282
Patent Medicine Licence 118
———, Messrs. Attwood and Renton's, for Improvements in the Manufacture of Starch..... 539
Patents, Sugar 291
Patronage of Homœopathy 495
Peat Moss and Peat Charcoal, Uses and Properties of, by J. W. Rogers..... ...87, 195
Penalties for selling Spirit of Wine 300
Peppermint, Oil of (B. Sandrock) 580
Pereira, Dr., on the Alcohol Test of the Purity of Croton and Castor Oils..... 499
——— on the colouring Matters of Dutch or Cake Litmus 12
——— on the commercial Varieties of Ginger 212, 261
——— on the commercial Varieties of Turmeric 309
——— on an undescribed Species of large Cardamom 313
Pharmaceutical Association, Bristol 360
———Associations, Provincial..... 250
———and Botanical Desiderata 285, 334, 585
———Cabbage 292
———Chemist, professional Character of 345
———Chemists at Liverpool, Meeting of 40
———Institution, Birmingham 254
——— Legislation 558
———Meeting, 9, 203, 400, 452
——— Liverpool 66, 168
———Preparations, fermented (Butler Lane, M.D.) ... 31
———School Dinner ...8, 56
———Society, approaching Anniversary of 493
——— Society, Evening Lectures at 254, 303

PAGE
Pharmaceutical Society, Ninth Anniversary of 553
——— Transactions of, 9, 56, 119, 203, 253, 302, 349, 400, 451, 496, 551
Pharmacy in Guernsey 297
——— in Hungary..... 191
——— School of 104, 145
——— Progress of 50
——— Rejection of, at Lincoln's Inn Fields 397
Pharmacopœia, the 397
Pharmacy, Provincial Schools of 556
Philosophical and Chemical Society, Birkenhead..... 462
Phytelephas Macrocarpa (Sir W. Hooker) 369
Piacaba and Coquilla Nuts (Sir W. Hooker) 431
Picciotto, H., on the Purification of Gum Arabic 16
Pigment, Oxide of Zinc as (M. Chevalier) 530
Pimlico Sewer Catastrophe..... 286
Pitch Lake of Trinidad, Account of (Mr. Darling) 18
Plants, Elementary Organs of, (Mr. H. S. Evans) 497
———Indigeneous in the Antilles, Purgative Properties of Oils obtained from (W. Hamilton) ... 129
——— from which Senna Leaves are obtained (J. B. Batka)..... 25
Plaster, Lead, improved Process for making (Mr. W. Bartlett) 457
Plucker, Prof., on the momentary Incombustibility of Organic Tissues 433
Plumose Alum, production of (Robert Christison, M.D.) 14
Pochin, Mr. H., on Dilution of Ether 278
Poggiale, M., on the Estimation of Sugar of Milk 72
Poison discovered in a Body after Eight Year's interment 86
Poisoned Game 339
Poisoning, Secret 201
——— Family 86
——— by Arsenic 284, 285
——— Muriatic Acid..... 284
Poisons, Sale of, 160, 205, 249, 253, 297, 451, 548, 557, 589
——— Correspondence on 352
——— Questions on..... 253
——— with some Statistical Returns of Suicides, Accidents, &c. (W. T. Fewtrell) ... 357
——— Report of the Committee on 302

PAGE

Poisoning by Sheep Dipping Composition 590
Polarization of Heat 138
Polishing Powder for the Specula of Telescopes..... 238
Porcelain Glaze, Aventurina-like (A. Wachter)..... 80
Portable Medicines for Diarrhœa.. 175
Potash, Trichromate of 393
Pottinger, F. X., Formulæ for the Preparation of Sealing-wax..... 133
Powder, Polishing, for the Specula of Telescopes..... 238
Preparation of Hydrobromic and Hydriodic Acids (C. H. Mène) 80
——— of Nitrogen (M. B. Corenwinder) 132
——— Rosin Oil and Rosin Gas 589
——— of Sealing-wax, Formulæ for (F. X. Pottinger) 133
——— Specula for Telescopes 236
——— of Soda Water and other Ærated Waters (Messrs. Tylor and Son's) 511
——— of Tinctures, Apparatus for (Mr. Samuel Gale) 459
Preparations, Pharmaceutical, fermented (Butler Lane) 31
Prepared Cochineal for colouring Jellies, &c. 443
Prescription, alleged, of Sir J. Clark's for Cholera 151
Presence of Chloroform, Test for 584
Presentation of a Testimonial to Mr. Redwood by his Pupils..... 553
Preservation of Leeches (Mr. C. E. Ashby) 34
——— of Milk or Cream... 186
Printer's Ink from Rosin Oil 586
Prizes, Distribution of..... 203
Proceedings against unqualified Practitioners 289
Process for detecting Cinchonine in Sulphate of Quinine (M. O. Henry) 320
——— for estimating the Quality of Opium (M. A. Guilliermond) 236
——— Improved, for making Lead Plaster (Mr. Bartlett) 457
——— for making Amber Varnish (Sterling) 137
——— for manufacturing White Lead (Mr. J. E. D. Rodgers) ... 440
——— for obtaining Carburetted Hydrogen Gas (M. F. J. De Cavaillon) 441
Production of Manna (Mr. J. Stettner) 283

PAGE

Products of French Industry, Exposition of 127
Professional Character of the Pharmaceutical Chemist 345
Progress of Pharmacy 50
Progress of the Water Question... 550
Prohibition of the Sale of Stills by Brokers and others 347
Proper Business of the Apothecary 1
Properties of Oil of Anda (Alex. Ure) 9
——— of Sulphate of Lead, Toxicological 434
Property in Quack Medicines..... 487
Proposed Restrictions on the Sale of Arsenic (J. Tunstall, M.D.).. 175
Protein Compounds 188
Protosulphate of Iron, Change which it undergoes in the Air (G. C. Wittstein) 38
Provincial Pharmaceutical Associations 250
——— Schools of Pharmacy 556
Prussian Blue, Action of Light on (M. Chevreul) 236
Puffing Quack Medicines, Mode of 163
Purgative Properties of Oil of Anda (Alexander Ure) 9
Purification and Properties of Chloroform (W. Gregory, M.D.) 580
Purification of Drinking-Water... 474
——— of Gum Arabic (H. Picciotto) 16
——— of Honey (André V. Hirschberg) 543
——— of Water 507
Pyroxilic Spirit, Test for distinguishing Acetone from (Maurice Scanlan)..... 455

Quack Medicines, Mode of Puffing 163
——— Property in 487
Quackery 4, 55
Quality of Indigo, Test for (H. Reinsch) 234
——— of Opium, Process for estimating (M. A. Guilliermond)... 236
Quantitative Determination of Sugar and Starch by means of Sulphate of Copper (H. Fehling) 419
Questions for Examination in Botany 204
——— in Chemistry and Pharmacy 204
——— in Materia Medica 203
——— on the Sale of Poisons... 253
Quinine, Sulphate of, use of Residual Cinchona Barks in the Manufacture of (Schlottfeldt)... 542

PAGE

Quinoidin, Adulteration of 84
———— and β-Quinine (J. Von Heijningen) 322

Ragsky on the Detection of Chloroform in the Blood 37
Rand, B. Howard, on Animal Charcoal as an Antidote 78
Reaction of Borax on Tincture of Turmeric (Dr. Vogel, jun.)..... 441
Red Colour for Paper Hangings ... 588
———— Show Bottles 594
Red Ink 343
Redwood, T., on the Adulteration of Isinglass..... 503
Refining of Sugar, Improvements in..... 220
Reform, Medical.....1, 397
Registrar General's Return, extract from 481
Reinsch, Dr. H., Construction of a Galvanic Cell without Zinc..... 533
———— on a Test of the Quality of Indigo 234
Rejection of Pharmacy at Lincoln's Inn Fields 397
Relations between the Animal and Vegetable Kingdoms (Robert Warington) 521
———— existing between Sugar and Tartaric Acid (M. Bouchardet) 72
Relative Expansions of Mixtures of Alcohol and Water (G. H. Makins) 181
Remarks on Blowpipe, Reactions of Strontia, Baryta, &c. (Dr. Sheridan Muspratt) 259
Remarks on the Bootle Water (Dr. Sheridan Muspratt) 564
Removal of Grease..... 295, 344
———— Ink Stains..... 295
———— Ironmoulds 295
———— Nuisances 445
Repeal of the Window Tax..... 398
Report of the Committee on the Sale of Poisons 302
———— on the Law relating to the Importation of adulterated and spurious Drugs, &c. (M. J. Bailey, M.D.)..... 147
———— of a Lecture on the Gases (F. W. Griffin) 360
Researches on the Organic Radicals (Dr. E. Frankland) 489
Resin of the Norway Spruce Fir (Daniel Hanbury, jun.) 400
Reviews:
Benzole: its Nature and Utility (C. Blackford Mansfield, M.A.) 90

PAGE

Reviews:
Digest of Second Reports on Sanitary Reforms (W. Simpson) 47
The Druggist's General Receipt Book (Henry Beasley)..... 491
The Electro-chemical Causes of Cholera and other Complaints (Sir J. Murray, M.D.) 199
A few Suggestions on Consumption (Robert Hall, M.D.)..... 342
A Grammatical Introduction to the London Pharmacopœia (S. F. Leach) 342
Heber die Unorganischen Bestandtheile in den Organischen Körpern (Von Heinrich Rose) 292
Histoire Naturelle des Quinquinas (M. H. A. Weddell)... 292
Lectures on Electricity (H. M. Noad) 47, 90
A Manual of Botany (J. H. Balfour, M.D.) 339
A Manual of Scientific Inquiry (Edited by Sir John E. W. Herschel) 242
Medical and Œconomical Botany (John Lindley) 244
The Microscopic Anatomy of the Human Body in Health and Disease (Arthur Hill Hassall) 198
Observations on London Milk (H. Hodson Rugg, M.R.C.S.) 90
Report of the Chinese Hospital at Shanghae 342
Report of Facts (A. Turnbull, M.D.) 47
Reports of the Royal College of Chemistry, and Researches conducted in the Laboratories 46
The Rudiments of Botany (Arthur Henfrey) 341
Sanitary Economics (Alexander P. Stewart, M.D.)..... 342
The Use of the Blowpipe in the Examination of Minerals, &c. (Prof. Plattner, edited by Dr. Sheridan Muspratt) 196
The Use and Abuse of Alcoholic Liquors in Health and Disease (W. Carpenter, M.D., F.R.S.) 591
Rhamnus Frangula and R. Cathartica, Barks of, Analysis of (M. Binswanger) 537
Rhine Wines 135
Rhubarb, Action of Nitric Acid on, and production of a New colouring Matter, Erythrosin (M. Garot)..... 528

PAGE

Rhubarb, Tincture of, colouring Matter in (Mr. John Cobb)..... 529
Rice Paper, or Bok-Shung, Chinese 545
Rise and Progress of a Specific ... 291
Robbery by means of Chloroform 393
Roder, Mr., on the Concentration of Sulphuric Acid in Cast-iron Pots..... 390
Rodgers, Mr. J. E. D., on an improved Process for manufacturing White Lead..... 440
Rogers, Mr. Arnold, on Amalgams for stopping Teeth 402
——— Mr. Jasper W., on the Uses and Properties of Peat Moss and Peat Charcoal 87, 195
Root, Ava, of the Sandwich Islands (W. Hamilton) 218
Rosin Oil, Preparation of 589
Rottenness in the Metropolitan Commission of Sewers 116
Rouchet, M., on a New Method of Analysing Metallic Salts 233
Royal Institution, Lecture on the Electricity of the Air (Prof. Faraday)..... 442
——— ——— Lectures, by Prof-Grove and Prof. Brande 395
Royle, Dr., on East Indian Senna 360
Runge's Chrome Ink..... 588

Sacc, Analysis of the Seeds of the White Poppy..... 543
Sale of Arsenic, proposed Restrictions on (J. Tunstall) 175
——of a Business, alleged Breach of Covenant in 591
——— Laudanum by Chemists 590
——— Poisons, 160, 205, 249, 253, 297, 451, 557, 589
——— Correspondence on 352
——— Questions on..... 253
——— with some Statistical Returns of Suicides, Accidents, &c. (W. T. Fewtrell) 357
——— Report of the Committee on 302
——— Stills by Brokers and others, Prohibition of 347
Salep (Dr. X. Landerer) 435
Salicine, Test for 443
Salts, Metallic, New Method of Analysing (M. Rouchet) 233
———of Morphia, Correspondence relating to the Adulteration of 483
Sandrock, B., Oil of Peppermint... 580
Scanlan, Maurice, Test for distinguishing Acetone from Pyroxilic Spirit 455

PAGE

Schlottfeldt on the Use of Residual Cinchona Barks in the Manufacture of Sulphate of Quinine 542
School of Pharmacy 104, 145
Schools of Pharmacy, Provincial 556
Schultze, Dr. M. A., on the Action of Sugar and Sulphuric Acid on Organic Substances 423
Schulze, Fr., on Amidulin, a Modification of Starch 142
Science, British Association for the Advancement of..... 189
———Unreasonableness of..... 143
Sea-water, Carbonate of Lime an Ingredient of (John Davy)..... 178
Sealing Wax, Formulæ for the Preparation of (F. X. Pottinger)... 133
Secret Poisoning 201
Seeds, Mustard, Expressed Oil of (St. Darby) 81
—— of the White Poppy, Analyses of (Sacc)..... 543
Senna, East Indian.....360, 401
——— Leaves (F. L. Bley and E. Diesel)..... 141
——— Plants from which they are obtained (J. B. Batka) 25
Sewer Catastrophe, Pimlico 286
Sewers of the Metropolis..... 448
——— Metropolitan Court of..... 116
——— of the Metropolis, Survey of. 51
——— Rottenness in the Metropolitan Commission of 116
Sheringham's, Mr., Ventilator 303, 350
Sheep Dipping Composition, poisoning by 590
Silver and Lead, Presence of in Sea-Water (MM. Malaguti, Durocher, and Sarseau) 522
——- Metallic, Method for determining the Purity of..... 47
Silvering Glass by the Employment of Gun-Cotton..... 140
Snow, John, M.D., on the Alleged Employment of Chloroform by Thieves 535
Society, Botanical, of London, 87, 195
——— Chemical 489
———and Philosophical, Birkenhead 462
——— Linnæan, New President of 289
——— Pharmaceutical, Evening Lectures at 254, 303
——— Transactions of, 9, 56, 119, 203, 253, 302, 349, 400, 451, 496, 551
———Pharmaceutical, Approaching Anniversary of 493
———Westminster Medical 394

PAGE

Soda-Water, Preparation of (Messrs. Tylor and Sons) 511
Solubility of Iodine in Cod-Liver Oil 541
Solutio Cantharides Etheriales ... 588
Solution of Protosulphate of Iron, Change which it Undergoes in the Air (G. C. Wittstein)..... 38
Solvent for Caoutchouc, &c., Chloride of Carbon as 334
Sonometer, the 132
Soubeiran, M., on the Composition of Honey 74
Spatulas, Whalebone (T. H. Tustin) 339
Specific for the Gout, Murray's ... 291
——— Rise and Progress of 291
Specula for Telescopes, Preparation of..... 236
——————————— Powder for 238
Spheroidal State of Bodies (P. H. Boutigny) 75
Spirit, Pyroxilic, Test for distinguishing Acetone from (Maurice Scanlan)..... 455
——— of Wine, Penalties for selling 300
Spontaneous Decomposition in Gun-Cotton (Mr. T. H. Tustin) 405
Spruce Fir, Norway, Resin of (Mr. Daniel Hanbury, jun.) 400
Spurious Ferri Citras Cum Quina (Mr. J. B. Barnes)..... 279
——— Tannate of Alumina ... 406
St. Darby, on Expressed Oil of Mustard Seeds 81
Stamp Acts, Medicine 251, 298
Starch, Employment of, as a Test for Minute Quantities of Iodine (M. L. Thorel) 283
——— Manufacture of, Messrs. Attwood and Renton's Patent for Improvements in 539
——— Amidulin, a Modification of (F. R. Schulze)..... 142
Starches of Commerce 120
Stark, James, Notice of the Copalchi Bark 463
Stein, W., on Wongshy, a New Yellow Dye 541
Sterling's Process of making Amber Varnish 137
Stettner, Mr. J., on the Production of Manna 283
Stills, Sale of, by Brokers and others, Prohibition of 347
Stocks, J. Ellerton, M.D, on Balsam Trees from Scinde..... 270
Strontia, Baryta, &c., Blowpipe Reactions of (Dr. Sheridan Muspratt) 259

PAGE

Strychnia, method of detecting the Presence of (Mr. Lewis Thompson) 24
——— Test for, Letter on (Mr. Lewis Thompson) 131
Substitute for Cantharides 239
Substitution of one Medicine for another..... 176, 101
Sugar, use of Acetate of Lead in the manufacture and refining of 334, 390
———Improvements in the manufacture and refining of 220
——— of Milk, Estimation of (M. Poggiale)..... 72
——— Patents 291
——— Presence of in certain Liquids, New Re-Agents for Detecting (M. Maumene)..... 587
———and Sulphuric Acid, Action of on Organic Substances (Dr. M. A. Schultze)..... 423
——— and Starch, Quantitative Determination of, by means of Sulphate of Copper (H. Fehling) 419
——— and Tartaric Acid, relations existing between (M. Bouchardet) 72
Sulphate of Copper, determination of Sugar by (H. Fehling)..... 419
——— of Lead, Toxicological Properties of 434
——— of Quinine, Process for detecting Cinchonine in (Mr. O. Henry) 320
——— of Quinine, use of residual Cinchona Barks in the manufacture of (Schlottfeldt) 542
Sulphur, Fumigation of Wheat with (Mr. H. C. Andrews) 239
Sulphuric Acid, Concentration of, in Cast-iron Pots (Mr. Roder)... 390
——————— and Sugar, action of, on Organic Substances (Dr. M. A. Schultze) 423
Superphosphate of Lime 492
Supply of Water to the Metropolis 348
Survey of the Sewers of the Metropolis..... 5
Sweet Spirit of Nitre, Accident with..... 247

Table of Commercial Cinchona Barks 240
Tannate of Alumina, spurious..... 406
Tartaric Acid and Sugar, relations existing between (M. Bouchardet) 72

PAGE
Taraxacum, Extract of..... 48
Tartarus Boraxatus (Wackenroder) 327
Teeth, Amalgams for Stopping (Mr. Arnold Rodgers) 402
Telescopes, Polishing Powder for the Specula of 238
——— Specula for, Preparation of 236
Temperature at which Gun-Cotton explodes 440
Test, Alcohol, of the Purity of Castor and Croton Oils (Dr. Pereira) 499
—— for distinguishing Acetone from Pyroxilic Spirit (Maurice Scanlan) 455
—— for Croton Oil 296
Test for the Presence of Chloroform..... 584
——for minute Quantities of Iodine (M. L. Thorel) 283
—— of the Quality of Indigo (H. Reinsch) 234
—— for Salicine..... 443
—— for Strychnia, Letter on (Mr. Lewis Thompson) 131
Testimonial to Mr. Redwood, Presentation of 553
Tests of the Purity and Adulteration of the Volatile Oils (G. H. Zeller)..... 575
Thames Water, Composition of ... 471
Thomson, Dr. Anthony Todd, Death of..... 90
Thompson, Mr. Lewis, Letter on Test for Strychnia..... 131
———————on a Method of detecting the Presence of Strychnia 24
Thorel, M. L., on the Employment of Starch as a Test for minute Quantities of Iodine 283
Tincture of Arnica 548
——— Cantharides 395
———Capsicum, concentrated (Dr. Turnbull) 362
——— Indian Hemp 443
——— Opium, variable Strength of (Mr. Alfred Allchin) 454
——— Rhubarb, colouring Matter in (John Cobb) 529
——— Turmeric, Reaction of Borax on (Dr. Vogel, jun.)..... 441
——— Warburg's Fever..... 134
Tinctures, Apparatus for the Preparation of (Mr. Samuel Gale) 459
Tinctura Ferri Acetici Œtherea 144
Tinning and Zincing, Composition for 143
PAGE
Titanium Crystals, Composition of (Prof. Wöhler) 315
Tobacco, alleged Adulteration of with Liquorice 241
——— of Congo 143
Toxicological Properties of Sulphate of Lead..... 434
Toxicology, Lecture on (Dr. Brett) 168
Train-oil Capsules 279
Transactions of the Bristol Chemists' Association..... 63
——————— Liverpool Chemists' Association 7, 210
——————— Pharmaceutical Society, 9, 56, 119, 203, 253, 302, 349 400, 451, 496, 551
Treatment of Cholera 152
Trees, Balsam, from Scinde (J. Ellerton Stocks, M.D.)..... 270
Trial respecting a Nuisance, Jewell *v.* Etwall and Another 485
Trichromate of Potash..... 393
Trumper, Mr., on Hydro-Carbon, or Water-Gas..... 210
Tunstall, J., proposed Restrictions on the Sale of Arsenic 175
Turmeric, commercial Varieties of (Dr. Pereira)..... 309
——— Tincture of, Reaction of on Borax (Dr. Vogel, jun.)..... 441
Turnbull, Dr., on Concentrated Tincture of Capsicum 362
Turnsole (Daniel Hanbury, jun.) 308
Tustin, Mr. T. H., on spontaneous Decomposition in Gun-cotton ... 405
——— on Whalebone Spatulas 339
Tylor and Sons', Preparation of Soda-water and other Aerated Waters 511

Unguentum Potassii Iodidi (A. W. Brieger) 543
Unqualified Practitioners, Proceedings against..... 289
Unreasonableness of Science 143
Ure, Alexander, on the Purgative Properties of Oil of Anda 9
Use of Acetate of Lead in the Manufacture of Sugar (J. G. Miranda) 390
——————— in the Manufacture and Refining of Sugar 334
——of Chloroform, Alleged 585
Uses and Properties of Peat Moss, and the Value of Peat Charcoal as a Disinfectant (J. W. Rogers) 87, 195

PAGE

Use of Residual Cinchona Bark in the Manufacture of Sulphate of Quinine (Schlottfeldt) 542
Value of a Chemists' Business, Mode of Estimating 109
Vanilla of the Island of Bourbon (M. Bouchardet) 275
Variable Strength of Tincture of Opium (Alfred Allchin) 454
Varieties of Ginger, Commercial (Dr. Pereira) 212, 261
——— of Turmeric, Commercial (Dr. Pereira)..... 309
Varnish, Amber, Sterling's Process of making 137
Varnished Leather, Manufacture of, in France 333
Vegetable and Animal Kingdoms, Relations between (Robert Warington) 521
——— Ivory Palm, Account of (Sir W. J. Hooker) 369
Ventilating and Heating, Notes on 315
Ventilator, Mr. Sheringham's, 303, 350
Vessels coated with a Vitrified Enamel for use in Laboratories (M. Chevalier) 277
Vitrified Enamel, Vessels coated with, for Use in Laboratories (M. Chevalier) 277
Vogel, Dr., jun., on the Action of Nitric Acid on Iodide of Potassium 391
——— on Bees'-wax 135
——— on the Reaction of Borax on Tincture of Turmeric..... 441
Volatile Oils, Tests of the Purity and Adulteration of (G. H. Zeller)..... 575

Wachter, A., on Aventurina-like Porcelain Glaze..... 80
Wackenroder, on Tartarus Boraxatus 327
Wagner, A., on Iridescent Paper 544
Warburg's Fever Tincture 134
Ward, Mr. W. S., on the Electric Light 191
Warington, R., on the Relations between the Animal and Vegetable Kingdoms 521
Water and Alcohol, Mixtures of, relative Expansions of (G. H. Makins) 181
——— Aluminous, Analysis of (Mr. Thomas Beesley)..... 452
——— Animalcules found in 281
Water, Bootle, some Remarks on (Dr. Sheridan Muspratt)..... 564

PAGE

Water Companies, Battles of..... 399
——— Distilled, Apparatus for (Mr. Abraham)..... 170
——— Drinking, Nature and Effects of the Organic Matter contained in 408
——— Drinking, Purification of 474
——— Lake and Well of London, Composition of 472
——— Lime, on the Composition of (G. C. Wittstein)..... 37
——— Organic Matter in (Prof. Forchhammer) 281
——— Purification of 507
——— River and Well, Composition of..... 473
——— Question 449
———Question, Progress of 550
——— Sea, Carbonate of Lime an Ingredient of (John Davy, M.D.) 178
——— Presence of Lead and Silver in (MM. Malaguti, Durocher, and Sarseau)..... 522
——— Soda, Preparation of (Messrs. Tylor and Sons) 511
——— Supplied by the Hampstead Water Works Company, Composition of (Mr. John Mitchell) 389
———Supply of to the Metropolis 347
———Thames, Composition of ... 471
———Well, at the Royal Mint, Analysis of (W. T Brande) ... 383
Waters of the Metropolis, 382, 417, 466
Wax, Bees' (Dr. Vogel, jun.) 135
—— Sealing, Formulæ for the Preparation of (F. X. Pottinger) 133
Weather and the Leech (William H. Attree) 85
Weddell, M. H. A., on Calisaya Bark 428
———————on the Cinchona Barks 267
———————on Cinchona Calisaya 232, 365
——— ———on Cephaelis Ipecacuanha 332
———————on the Natural History of the Cinchonas..... 224
Well, Artesian, on Islington Green 389
—— Water, Composition of 472, 473
———————at the Royal Mint, Analysis of (W. T. Brande)..... 383
Westminster Medical Society 394
Whalebone Spatulas (T. H. Tustin) 339
Wheat, Fumigation of with Sulphur (Mr. H. C. Andrews) 239
White and Black Mustard Seeds, expressed Oil of (St. Darby) ... 81

PAGE

White Enamel for Cementing Earthenware and Glass 589
——— Lead, Belgian sorts of. 542
———————— Improved Process for the manufacture of (Mr. Rodgers)..... 440
——— Liniment 47
——— Paint, Oxchloride of Lead for 390
——— Poppy, Analysis of the Seeds of (Sacc) 543
——— Precipitate, Adulteration of 240, 280, 339
Wilkinson, Mr. J., on the Electric Light 68
Winckler, Dr. F. L.,on Aristolochia Clematitis 543
———————————— on the Bitter Matter of ripe Buckthorn Berries 542
Window Tax, Repeal of 398
Wine, Spirit of, Penalties for selling 300
Wines, Medicinal (Butler Lane, M.D.) 171, 215
——— Rhine..... 135
Wittstein, G. C., on the Change which a Solution of Proto-sulphate of of Iron undergoes in the Air 38

PAGE

Wittstein on the Composition of Chalk 278
———————— of Lime Water 37
————————————Marble 278
Wöhler, Prof., on the Composition of Titanium Crystals met with in Blast Furnaces 315
Wongshy, a New Yellow Dye (W. Stein) 541
Works of Industry of all Nations, Exhibition of..... 339, 450, 549, 557

Xyloidin and Gun-cotton..... 38

Yearsley, Mr., on Glycerine 68
———————— on the use of Glycerine in Deafness..... 132
Yellow Dye (W. Stein) 541

Zeller, G. H., Tests of the Purity and Adulteration of the Volatile Oils 575
Zinc, Oxide of, Importation of Duty free 532
———————— as a Pigment (M. Chevalier) 530
Zincing and Tinning, Composition for 143

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